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M O N T A N A

PROGRESS REPORT

STATE PLANNING CONSULTANT

to the

NATIONAL RESOURCES BOARD

June 16, 1935.

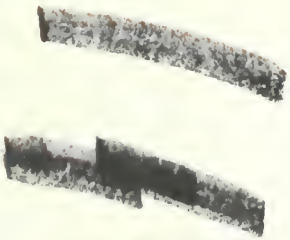
Section I - Introduction

In order to understand the situation in Montana as it affects planning, it is necessary to have a rather clear picture of the variety of conditions and the multitude of problems involved.

Montana is the third largest state in the Union and is larger than the combined area of the New England States. It is 550 miles from east to west and 350 miles from north to south. If one corner of the state could be placed at Chicago, the other corner would reach three-fourths of the way to the Atlantic Ocean. In this great area of ninety-three million acres are living 550,000 people. An average of more than 160 acres for every man, woman and child in the state.

The eastern third of Montana is a great rolling plain cut by three principal drainage areas, namely; the Milk, Missouri and Yellowstone Rivers, with their tributaries. Here has been developed a great range livestock industry, intermingled with dry land farming, with partially developed irrigated stream valleys furnishing winter feed for stock and intensive agriculture.

The central third of the state, rougnly speaking, is foothill and mountainous country, gradually increasing in elevation to the crest of the Continental Divide which cuts the state from north to south. This



is a country of irrigated mountain valleys rather intensively farmed and supplemented by the running of range cattle and sheep on the foothills and in the National Forests. Other major industries are mining, timber, oil and gas production. West of the Continental Divide is a similar mountainous country but with a somewhat milder climate and consequently more diversified agriculture including fruit and vegetable growing. Mining and timber production are also major industries.

Throughout the mountainous areas are sixteen million acres of National Forest. On the north is Glacier National Park and on the south is Yellowstone National Park. The forests in addition to their grazing and timber resources, present a continual unfolding of clear mountain streams, beautiful snow-capped peaks, lakes, and open parks - a natural out-door playground.

In this vast area of country with such extremely varied conditions, there naturally are an extremely complex group of problems and a multitude of conflicting interests. The dry land areas are going through a period of readjustment in size of farms and gradual thinning out in number of farmers. Farming interests are in many instances at variance with those of the stockmen.

The labor and industrial groups are at variance with the rural communities on questions of education, road building, social welfare and similar problems. Problems of taxation naturally are a controversial issue.

The sportsmen want game reserves and winter range for wild life protected against use by the stock industry. Similarly farmers drain the streams for irrigation while the fisherman desires to maintain a minimum flow to protect fish life. And so the list might be extended.

Montana people, as a whole are progressive and alert, but impatient. They are mostly of that class who came west with limited financial resources but with an urge to build and develop a new country. The state is too new to have produced a settled, established class of citizens living in stable communities where progress and change are slow,

The working out of any state program, comprehensive enough to make maximum use of the varied resources available will consequently be slow. It is almost essential that this program be the outgrowth of understanding and the adoption of plans and policies in the various districts of the state first. Then, as these district programs begin to take shape, they can gradually be put together into a plan for the entire state.

The State Plan.

But in spite of this, out of the past years effort has already come the beginnings of a well defined plan for conservation and unemployment relief which is fundamental to any long-time plan for ultimate maximum use of the state's resources.

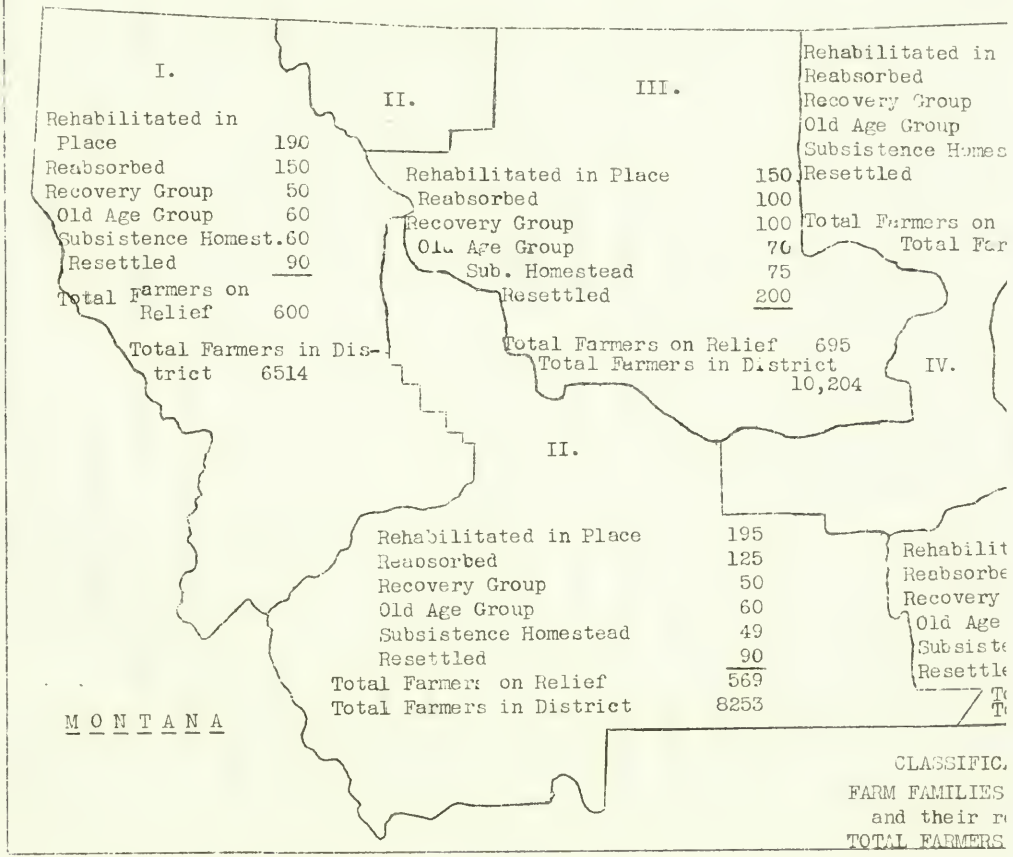
Exhibit A is a diagramatic Land Classification Map not accurate in detail, but illustrating the general trend of readjustment that is essential to agricultural stability in Montana. The darker areas on this map indicate where history has recorded that, due primarily to more favorable soils, farming has been successful without irrigation. These areas will probably continue to be primary wheat producing sections of the state for many years to come. The areas designated as third and fourth grade farm land are questionable. Farming is highly speculative and until such time as there is need for increased wheat production, these areas should be combined with grazing land and used primarily for range.

Exhibit B is a diagrematic picture of the irrigation needs and possibilities in Montana. It shows the present irrigated areas, the lands that are only partially irrigated, and the proposed irrigation developments. Comparing these two exhibits, it is easy to see the relationship between irrigation and land use. In the western third of the state, the primary need is to construct reservoirs to supply supplemental water to lands already under irrigation, to complete projects now under construction, and to extend canal systems to lands now being unsuccessfully dry farmed.

In the eastern two-thirds of the state, the need is to develop the irrigation possibilities along the stream valleys. These valleys are well distributed throughout the range area and irrigation brings about a balance between grass resource and winter feed production.

The construction of reservoirs also brings about stream regulation which has a direct benefit in enhancing the power output of existing power plants in the mountainous areas and improving the late season flow of the streams in the plains area, thus aiding in sewage disposal for the towns and cities.

The various proposed projects rated according to priority as a part of a long-time program, are discussed in detail in Section IV. This program of reclamation has a direct bearing upon the Rural Rehabilitation problem in Montana. Map I, gives by districts a classification of the farm families on relief as of January 1935. This classification was prepared by the Director of Rural Rehabilitation. There were a total of 8,251 farm families on relief out of a total of 47,495 farm families in the state. In addition, there were approximately 4,500 families on relief in the small towns which would come under rural classification,


I.
Rehabilitated in Place 190
Reabsorbed 150
Recovery Group 50
Old Age Group 60
Subsistence Homest. 60
Resettled 90
Total Farmers on Relief 600
Total Farmers in District 6514
II.
III.
Rehabilitated in Place 150
Reabsorbed 100
Recovery Group 100
Old Age Group 70
Sub. Homestead 75
Resettled 200
Total Farmers on Relief 695
Total Farmers in District 10,204
Rehabilitated in
Reabsorbed
Recovery Group
Old Age Group
Subsistence Homes
Resettled
Total Farmers on
Total Far
IV.
II.
Rehabilitated in Place 195
Reabsorbed 125
Recovery Group 50
Old Age Group 60
Subsistence Homestead 49
Resettled 90
Total Farmers on Relief 569
Total Farmers in District 8253
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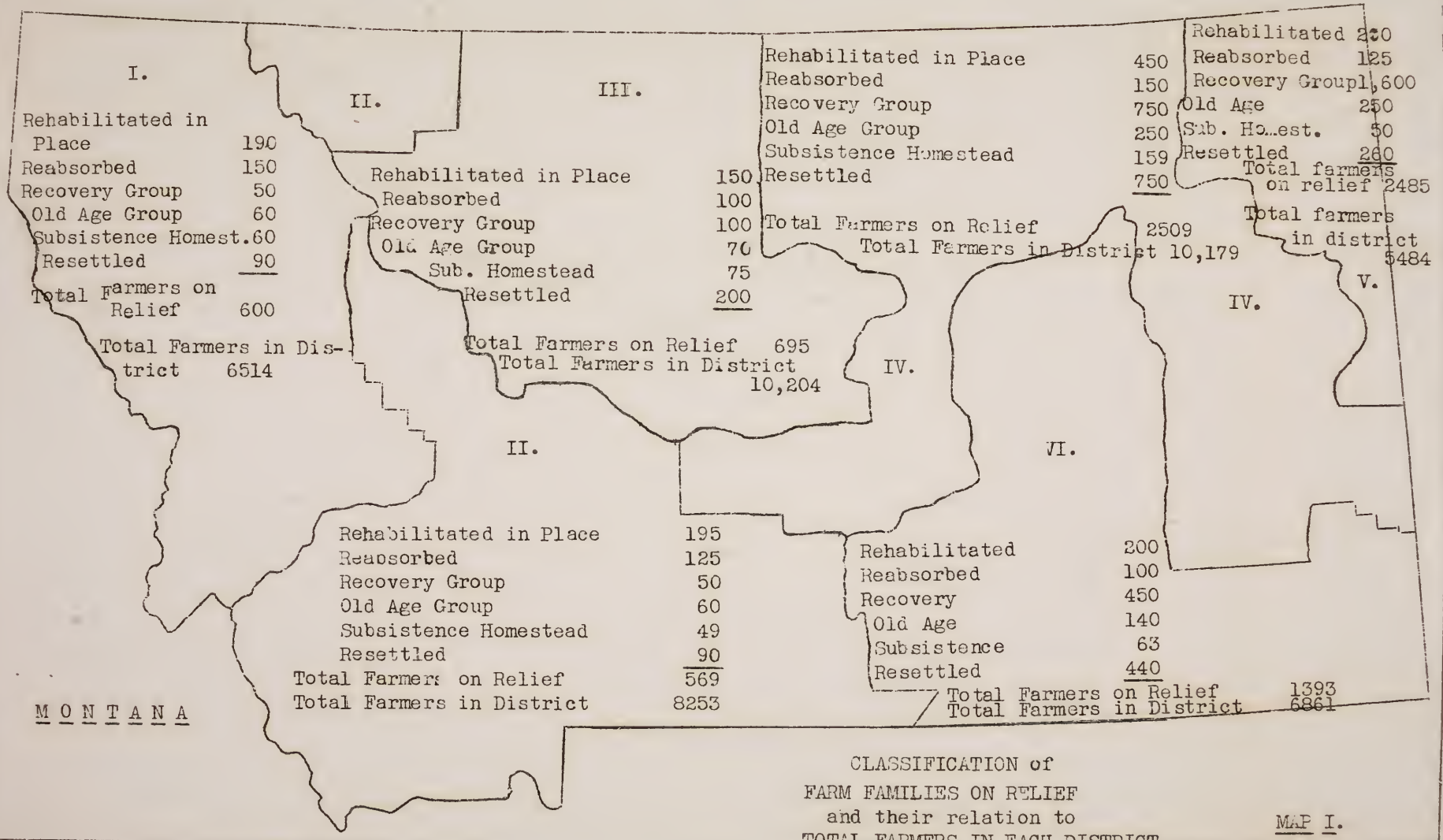

CLASSIFICATION of
FARM FAMILIES ON RELIEF
and their relation to
TOTAL FARMERS IN EACH DISTRICT

MAP I.

making in all 12,751 families. Of this total 3,000 are classified as economic recovery groups which means that they need only temporary assistance. Eight hundred and thirty of them are too old for active farm life or continuous employment. They present a special problem and will probably have to be subsidized continuously. Seven hundred and fifty are of that class who normally have seasonal employment on nearby farms and as agricultural conditions improve they will again be reemployed. One thousand three hundred and eighty-five can be rehabilitated on their own places through small loans or assistance in reorganizing their farms so as to make them self-supporting. Four hundred and six families, it is believed, should be placed on some type of subsistance homesteads where their income can be supplemented by providing opportunities for part time employment which they do not now have. One thousand eight hundred and thirty must be provided opportunities for relocation. To this number should be added four or five hundred families who are being bought out under the land repurchase program. The map gives an idea of the wide distribution of the problem throughout the entire state.

There is a total therefore of from 2,300 to 2,500 families who need new opportunities. The problem is what to do with them. It is futile to think that they can go east and find employment in industry. Neither are they that class of people who will be successful on small tracts of cut-over lands in the west. The most practical answer is to provide opportunities as near where they now live as possible and this can be done by proper development and use of the water resources.

Even in the successfully farmed dry land areas, we can anticipate a gradual thinning out of the population during the next few years. The

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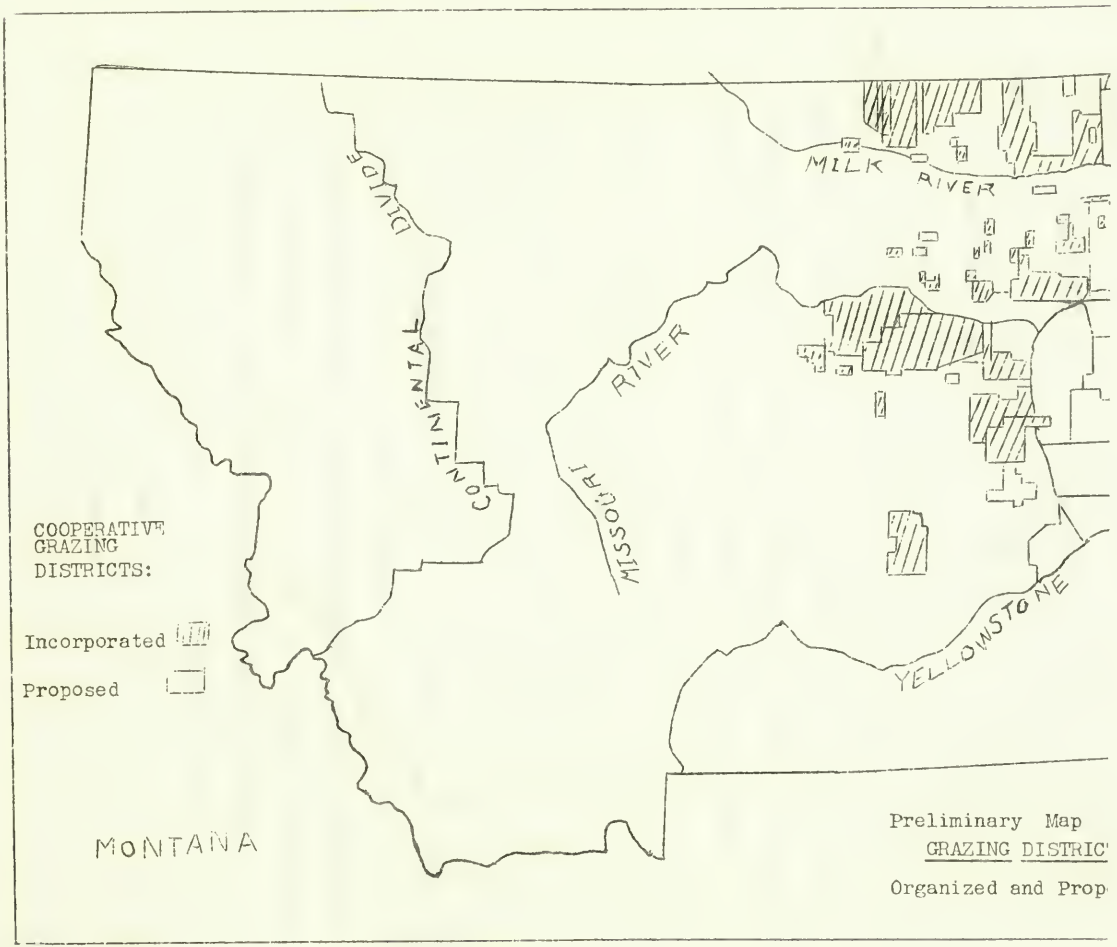
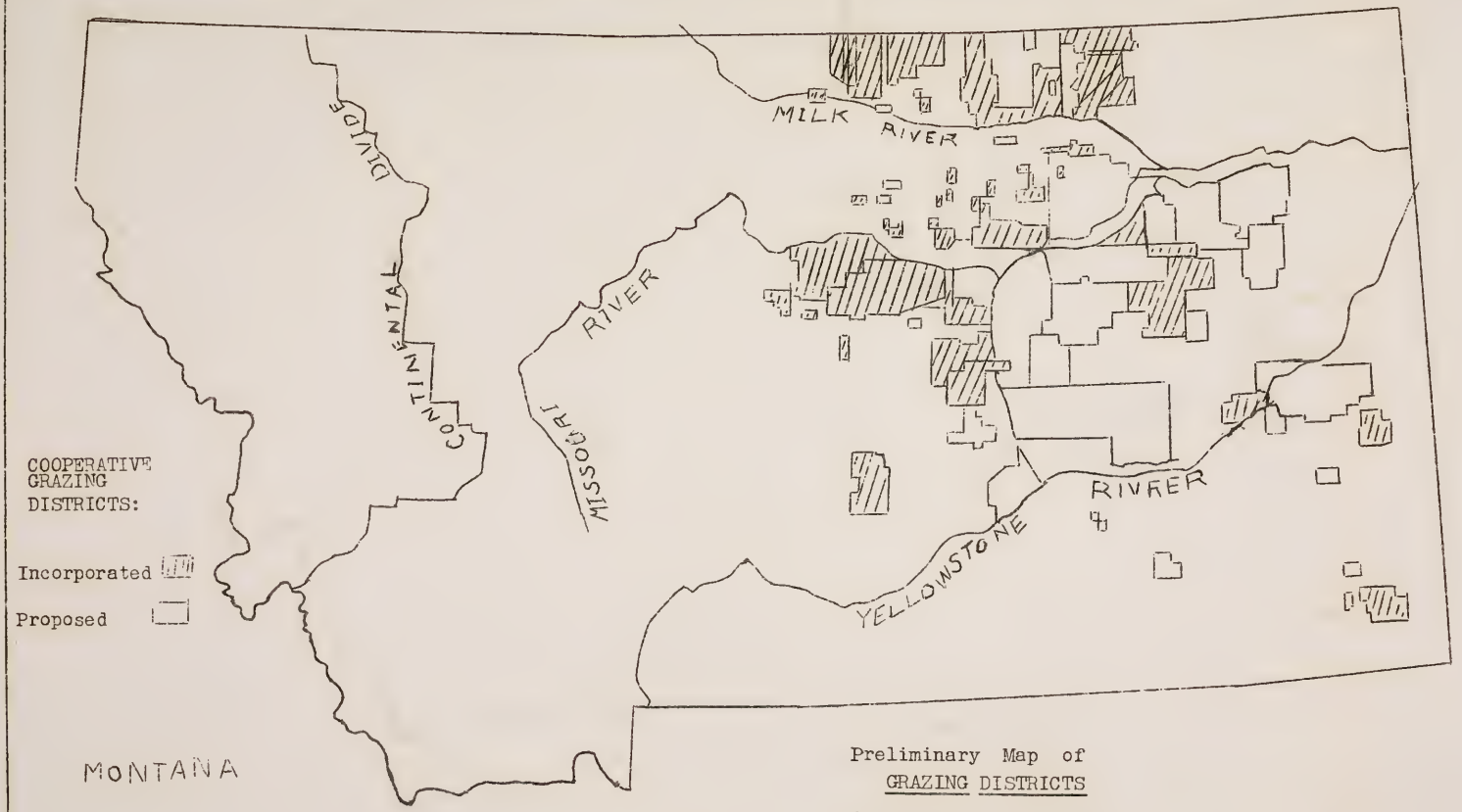

MILK RIVER
DIVIDE
CONTINENTAL
MISSOURI RIVER
YELLOWSTONE
COOPERATIVE GRAZING DISTRICTS:
Incorporated
Proposed
MONTANA
Preliminary Map
GRAZING DISTRIC
Organized and Prop



Preliminary Map of
GRAZING DISTRICTS
Organized and Proposed.

MAP II

adapted to the plans of the Works Progress Administration.

The second half of the program which has now been clearly defined as an essential part of a comprehensive plan for Montana has to do with industrial workers. There are approximately 18,000 strictly urban families on relief in Montana. In our small towns adjacent to agricultural communities, this relief load will be eliminated as the agricultural industry gets back on its feet. The principal problem is in our mining centers like Butte, Anaconda, Great Falls, Roundup and Red Lodge. Primarily, it is centered in Butte and Anaconda. There is a need for further study of this problem to determine how many of these miners or smeltermen will be reemployed with a return of normal demand for copper production. This will take time to work out and meanwhile there is an urgent need to find useful employment for these men for the next two years, at least.

Employment within the towns is limited because of the high concentration of common labor and the difficulty of finding useful work for such a large number of men for any long period of time. The highway and grade crossing elimination construction work will not meet their needs because such work requires a high percentage of skilled labor. Public buildings are in the same class and these two towns have about reached their limits on reimbursable projects. There is a certain amount of local road improvement, construction of swimming pools, recreation parks, etc., still available, but it is not believed that this work will last for more than three or four months.

This unemployment problem, however, is partly met through the Water Conservation Program. There are available within reasonable distance of all of our unemployment centers, sufficient projects fully engineered

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and ready for consideration, to keep these men employed for a period of two years at least. In this way Montana can meet her unemployment needs by the construction of useful projects which result in a high degree of permanent rehabilitation.

Unemployment relief can be further expanded in the field of permanent rehabilitation by aiding small mining industries. Exhibit C shows the location of the principal mineral resources of the State. Gold deposits are located principally in the mountainous districts, either on or adjacent to the National Forests. The increased price of gold has stimulated the reworking of old mining properties and the development of new mines. The roads to these properties have been neglected and considerable work needs to be done in order that the ore can be gotten out to market. Such road improvement will bring about more continuous mining activities and in consequence, contribute to permanent reemployment of many miners now on relief.

Montana does have a plan therefore, which includes restoration of submarginal lands to range use, the supplying of supplemental water to lands now under irrigation, the development of irrigated areas to balance feed production with grass resources, permanent rehabilitation of stranded rural families, encouraging the development of small mining industries and the employment of relief families on useful projects that are essential to this program.

Section II.

PLANNING PROGRESS DURING THE PAST SIX MONTHS.

The principal accomplishments during the past six months have been in the field of legislation, completion of a public works inventory,

some reorganization of committees and administration and a better co-ordination in the field of research. A brief outline of these accomplishments is given under the following general heads.

Legislation.

A legislative program was recommended to the Montana Legislature by the Planning Board with the following results:

1. Permanent Planning Board established with broad powers and duties and an administrative fund of $20,000 for the next biennium.

2. The State Water Conservation Board was established as a Montana Resource Board with broad powers and duties to cooperate with the Federal Government in a program of conservation and rehabilitation.

3. A state Electrification Authority was created to cooperate with the Administration in the construction of rural electrification lines and in the expansion of the use of hydro-electric power.

4. Authority was given to municipalities to establish housing authorities and to cooperate with such authorities in improving the living conditions of families of low income.

5. Bonds and elections of public bodies heretofore issued for public works projects were validated by special legislative enactment.

6. Municipalities were given full authority to construct and operate revenue producing undertakings, in cooperation with the Public Works Administration and to issue refunding bonds.

7. The United States was authorized to purchase county lands for the purpose of consolidating them with the National Forests.

8. The County Commissioners of any county were authorized to convey to the United States, lands acquired by tax deed and except in lieu thereof, government lands or standing timber of equal value, to assist in the consolidation of National Forest areas.

9. The counties and the state of Montana were authorized to cooperate with the Water Conservation Board in the construction of water conservation projects and to purchase

water or water rights for use on state, school or county owned land.

10. The State Water Conservation Board was provided with an annual appropriation of $100,000 for administration purposes and a revolving fund of $500,000 to be used in the construction of reimbursable projects for the carrying out of a Rehabilitation Program within the state.

11. Provision was made for the incorporation of Grazing District Associations to aid in the conservation, restoration and improvement of the range resources of the state.

12. A Grazing Commission was created to supervise the operation of such grazing associations.

Two other acts, recommended or approved by the State Planning Board did not pass the Legislature. One of these provided for the creation of Grazing Zones and the elimination of future expenditures for relief, road construction, or the maintenance of schools in such zones. The other was a recommended compact between Wyoming and Montana having to do with the allocation of water rights between those two states.

PUBLIC WORKS INVENTORY.

The State Planning Board cooperated with County Planning Boards and the Public Works Administration in an inventory of available projects within the state suitable for public works or work relief. One thousand nine hundred and one proposed projects were reviewed and rated according to need or suitability. These projects involved a total of more than $273,000,000. From this a digest was made of the available and more suitable projects which would provide a total of nearly 3,000,000 man days of work at a cost of approximately $34,000,000. A copy of this digest was filed with the National Resources Board. The projects which could not classify as reimbursable, were reviewed and a priority list of 800 recommended to the Montana Relief Commission for use by the newly organ-

ized Works Progress Administration.

Reorganization.

Several attempts have been made during the past year to set up a state coordinating committee which would function, not only in the field of planning, but bring about a closer relationship between Public Works, Work Relief and the general state program. This coordinating committee was finally reorganized into what now appears to be a very satisfactory arrangement. It is composed of the State Director of Public Works, the Director of the Works Progress Administration, a representative of the Montana State Water Conservation and Planning Board, the Director of Rural Rehabilitation, the State Planning Consultant, a representative of the Montana Grazing Commission, a representative of the Montana State College, and the Regional Director of the Land Policy Section of the AAA. The committee is now called the "State Executive Committee on Economic Development."

Instead of holding meetings in Helena, the committee has been meeting with County Planning Boards throughout the state. Nine such meetings have been held to date and three are scheduled for the immediate future. It is hoped that before the year is over, meetings will have been held in most of the counties. While some of the members have not been able to attend all of the meetings, they have been represented by someone from their organization. Through these meetings, the committee has been able to analyze the problems of the communities with the local people, which has proved highly successful in working out a practical program.

Administration.

The Administrative Staff of the Board was expanded to include a full time Assistant Secretary, adequate stenographic help, three draftsmen and two field reconnaissance engineers. The Board is providing its own offices fully equipped with desks, filing cabinets, typewriters, stationery, supplies, etc.

Research.

A study has been made of the various research activities being carried on by state institutions and a series of proposed planning projects prepared, whereby such research may be extended under the new works relief program through the employment of white collar workers. The projects are to be coordinated with those proposed by the Pacific Northwest Planning Commission. A detailed statement of them is given under Section III.

District Planning.

Because of the varied conditions in Montana and the fact that a comprehensive state plan must be developed through the gradual working out and coordination of district plans, a demonstration planning district was established with headquarters at Great Falls. This district roughly includes an area extending from Lewis and Clark County to the Canadian line and from the Continental Divide to Phillips and Petroleum Counties. The land classification, present land use, location of farms, public service maps, etc., prepared by the Montana State College by counties have been combined into a district map. The map has been turned over to a Land Use Committee of that area on which are men who have grown up with the agricultural development of that particular part of the state. They are studying it township by township and will make some changes, but

these changes will be minor. When they have completed their studies, it will be possible to begin the formation of a definite and more detailed land policy for that district. A similar map is now being prepared for the district extending from Phillips County to the North Dakota state line.

Rural Electrification.

Sponsored by the Power Resources Committee, the FERA has been conducting a Reconnaissance Rural Electrification Survey of the principal irrigated areas of the state. An explanation of this survey is given in the report under Section IV.

Mineral Resources.

A survey of the information available on the mineral resources of the state was started by the Mineral Resources Committee, January of this year. This survey is still in progress, but a preliminary report is given under Section IV.

Section III.

PROGRAM OF WORK FOR THE PERIOD JUNE 15, TO DECEMBER 15, 1935.

A detailed discussion of the work to be accomplished by December 15 of this year is dependent primarily upon the amount of help that may be available through the employment of white collar workers. Also the amount of funds allocated to the Pacific Northwest Planning Commission. There is included in this section a brief description of the various planning projects, applications for which are now prepared and ready for consideration by the Works Progress Administration. Supervision is available at the Agricultural College, School of Mines or State University. There is also included, a project for setting up a coordinating

staff in the Helena office.

In addition, there are certain activities which should be given immediate consideration.

Mapping.

We do not yet have in Montana a satisfactory understanding among the various federal and state departments on uniform standards and symbols to be used in the preparation of maps. Furthermore, many of the maps are colored. They are expensive and difficult to reproduce. It is desirable that a committee be organized to recommend uniform practices. Tracings should be made of the colored maps so that they can be made available for distribution.

Land and Water Resources.

Through the State Land Planning Consultant a Land Use Report has been submitted, together with considerable supplemental information. The U.S. Forest Service has submitted an independent land use report and similarly the Water Conservation Board has submitted a report on surface water, while the Geology Department of the School of Mines has sent in information on underground water supplies. Much other useful information on water resources has been collected having to do with water right laws, irrigation district laws, administration of water rights, pumping for irrigation, hydro-electric power resources and the protection of fish and water fowl.

These various reports should be brought together, analyzed and combined into a summarized report which will visualize more clearly a comprehensive plan for the state. The state plan can then be coordinated with those of the Federal Government in connection with rural rehabilitation, land purchase and similar activities dealing with land and water

resources. It should be the most important work before the Planning Board for the next six months.

District Planning.

At the Great Falls office, we now have under way, work which will complete a land classification map for all districts except south-central and western Montana. The maps for the two northern districts will be based upon detailed land classification surveys, already completed by the Montana State College. Those for the southern half of the state will be based upon the land classification work done for the great plains area by the U. S. Geological Survey.

Similar work has been started at Missoula in the preparation of a base map for the area west of the Continental Divide. Information available upon the resources of that area should be studied and as rapidly as possible, superimposed upon this base map.

No work has been started for the southwestern district including the territory adjacent to Helena, Butte and Anaconda. This area is so varied in character that it is difficult to visualize clearly the best procedure to follow. A base map should be prepared and similar study of the resources made so that we can begin to visualize the area in map form for determining more clearly the lines to follow when developing a plan for that area. This work should be started at the Helena office.

Legislation.

Legislation affecting the development and use of the resources of the state has been rather voluminous during the past ten years and much of it hastily enacted. There is considerable conflict, one law with another, and lack of general understanding. A man with some legal training and general understanding of the numerous problems involved should be assigned

to the Board to make a study of these various acts and prepare a digest for their consideration.

Planning Support.

The work of the Executive Committee on Economic Development has been very effective and the meetings held by that committee with local planning Boards should be continued. Field contacts with people are absolutely essential to bringing about a better understanding of the meaning and value of planning. In the mind of the general public, planning is confused with the consideration of projects for immediate construction and with national economic problems. While these are important, the projects are really the third step in the development of a program and the economic problems are so conflicting in both makeup and solution that consideration of them simply confuses the average individual. If, however, we can continue to increase interest in a study of resources, together with a recognition of the possibilities whereby their use might be enhanced, then the general public will not only continue to support state and local planning, but also National Planning in its broader aspects.

Water Resources Survey.

This survey is in three parts to cover the three important divisions having to do with the water resources of the state.

The first division is the measurement of streams which is carried on by the state jointly with the United States Geological Survey. This is a continuous program and a good deal of work has already been done. It is necessary to continue the present stream gauging stations and to establish additional ones to determine the run-off in streams on which there is no record at present. Annual cost, $30,000.

The second project is to determine the depth and quality of the shallow under-ground water supply for domestic and stock water purposes and for the irrigation of small tracts of land. This work will be done principally in stream valleys and most of it in that portion of the state which is primarily used for livestock production. The project contemplates the employment of five field parties to determine the amount and quality of water which can be secured in various locations - each party to be composed of one chief of party and four helpers and each equipped with a small well drilling outfit. Total cost $50,000.

The third project is for continuing the study of water resources and their relation to irrigation, power and flood control, coordinated with the land use and rural rehabilitation studies. This project proposes the employment of ten field parties of four men each, at a total cost of $180,000.

Mineral Resources.

Two projects are proposed to aid the mineral industry of Montana.

The first is a completion of the inventory of mineral resources including a compilation of all published matter relating to the mineral resources and the mining districts of the state, segregated as to different mineral products. This is to be followed by an investigation carried on in the field of geological engineers to complete and check information as published, particularly as regards the districts which have not been well covered by previous publication. The total cost is $50,000.

The second project proposes the completion of the geologic map of the state. A geologic map of the eastern half of the state was published in 1921 under the direction of Dr. C. H. Clapp, at that time President of the Montana School of Mines and of the State Bureau of Mines

valuable in the working out of range control and management programs on public lands and any other lands which are at present not under any organized form of control and management. Total cost $41,950.

The third project is for a survey of the range resources in the state, to obtain basic information. This fundamental information is needed, first, to determine the most practical range use that will perpetuate the native grazing resources; second, to determine the method of regeneration which will restore range areas to their maximum productivity; third, to determine methods of regeneration of submarginal lands, particularly plowed and abandoned lands; fourth, to investigate exotic forage plants to replace inferior native plants; fifth, to develop the method of best range use that will obtain the maximum utilization of the forage and at the same time perpetuate the vegetative cover. Total cost $50,000.

The fourth project is for the coordination and analysis of Montana land use planning studies. The purposes of this study will be to bring together, coordinate and analyze the studies and material available to date bearing on planning and use of rural resources. The specific objective of this study would be:

First, to analyze on the basis of county approach the land use areas of the state; second, to show the desirable adjustments which will improve the income, lower the costs and in general improve the living conditions and the quality of rural life in these areas; third, to show how these adjustments can be best accomplished. Total cost $13,000.

Forestry Investigations.

Six projects are proposed in connection with forestry and the forest industry.

The first is for the continuation of work on the State University experimental forest. The purpose of this work is to determine the most feasible method of management of the forest stands of Montana to: Guarantee perpetuity of the forest industry with its attendant; to obtain the maximum of indirect forest benefits, namely; water shed protection, erosion control, recreation and at the same time full utilization of forest produce; to determine the physical and mechanical properties of the forest crops; and to study the abatement of forest injuries. Total cost $21,700.

The second project is for the establishment of a forest research and biological station to study the various factors of forests and wild life in their relation to the economic welfare of the state. The specific studies proposed are: First, the influence of the environmental factor on forest growth; second, the relation of forest soils to forest growth; third, the biological influence on wild life; and fourth, the economic value of wild life. Total cost $10,000.

The third project is for the study of the relationship of shelter belts and wood lots to soil erosion control. This project proposes an investigation of the effect of windbreaks and shelter belts on the prevention of tilled soil erosion, on the decrease of soil moisture evaporation and on the conservation of winter precipitation. The purpose of this study is to discover the most suitable species of trees to obtain maximum results, to determine methods of planting and to determine the relationship between wind direction and the location and composition of the shelter belts. Total cost $34,032.

The fourth project is a cutover land study. It is to determine the extent of cutover lands and their possible development into economic use. Total cost $25,000.

The next project is closely allied to the cutover land survey and is a study to determine the possibilities of the use of drug and oil producing plants on a commercial scale. This project will first determine the possibility of the commercial utilization of native drug producing plants in their natural habitat. Second the highest economic use that may be made of the cutover lands not otherwise useful through the cultivation of drug plants on a commercial scale. Third, the utilization of stumps and other western lumber products for the production of flotation oil, music acid and other commercial products. Total cost $20,000.

The sixth project is to determine the climatic factor in forestry and agriculture. This is a study of climatic cycles by an analysis of meterological factors on agriculture and forest production. Meterological records are available for about sixty years and analysis can be carried back some 200 or 300 years through studies of vegetative growth and precipitation. Trends can be ascertained in sufficient detail to meet the demand of long time planning. Total cost $5,000.

All of these forest studies would be under the direction of the School of Forestry at the State University in Missoula, cooperating with the U. S. Forest Service.

Economic Studies.

The first of these is a basic study of population. This would cover the trends of population in Montana, including the study of the ability of each district to support its present population, its ability to support an increased population, the changes in district population and the migration of population, past and prospective. Total cost $25,000.

The second is an industrial survey to study the opportunities available for the development of manufacturing and of processing and also the economic changes which have taken place in the past ten years which may now make it possible to establish certain industries. Total cost $25,000.

The third project is a study of power resources. It would cover the present availability of electric power with its cost to the ultimate consumer and its use. It would also include the development of a future power market and an economic study of the cost of generation and distribution of electric energy. Total cost $10,000.

The fourth, is a continuation of the Rural Electrification Survey now being carried on by the Relief Administration as to the feasibility of rural electrification in the state. A great deal of work has already been done by them in the areas which seem to offer the most advantageous conditions for rural electrification and a continuation of this work to cover the more densely populated farming sections is contemplated. Total cost $46,500.

The fifth project is for a study of the recreational resources of the state. It proposes an investigation of the most feasible methods of developing community centers, recreational areas and parks for the benefit of the resident population and transients and to secure the greatest social and economic use of the entire region..Total cost, $25,000.

Planning Board Office Project.

In order to make available the data and conclusions secured by the above projects, the Planning Board proposes the employment of engineers, draftsmen and stenographers at their offices in Helena, Great Falls and Missoula. The purpose is to coordinate and make public results of these

various studies so that they can be of practical use, not only to planning boards, but to all interested people in the state. Total cost $20,000.

Section IV.

PLANNING STUDIES CARRIED ON BY OR FOR THE STATE PLANNING BOARD.

Mineral Resources.

The Mineral Resources of Montana were the cause of the first settlement within the state and to date have been the largest single producer of wealth since settlement began. The discovery of phenominally rich and easily worked deposits of placer gold started this settlement. It was continued by the development of gold and silver veins and large, high grade deposits of lead and copper ores carrying silver and gold. Finally the mining of zinc ores, together with the production of the fuels, coal, oil and gas and non-metallics such as phosphate rock, cement and others has kept the mining industry in the front rank of wealth producers in the state. The exhaustion of the placer gold deposits and the decline in the price of silver since 1893 has contributed to the concentration of metal mining activities to the mining of copper, zinc and lead ores, and lately to manganese ores.

Owing to the fact that all mineral deposits are subject to exhaustion in a relatively short time, it is necessary, if mineral production is to continue on its present scale, that additional deposits be discovered and developed continually. In order that this may be accomplished with a minimum of unproductive time and effort the known facts regarding our mineral deposits and districts should be made easily available to persons and corporations engaged in mineral development and

production.

The Mineral Resources Committee of the State Planning Board was organized on May 26, 1934. The Committee consists of nine members representing all the principal branches of the mining industry under the chairmanship of Dr. F. A. Thomson, President of the State School of Mines and the State Bureau of Mines and Metallurgy. After thoroughly canvassing the needs of the industry and the financial possibilities, the Committee was able with FERA help to begin an inventory of the published material on Montana ore deposits and districts. Work was begun on January 15, 1935 and to date the following reports are finished as far as available published information goes. Each has a full bibliography with references.

Iron Ores. Geological description of a deposit containing 2,000,000 tons of ore in Judith Basin County and brief account of eight other deposits in the same county. Also mention of fifteen other locations where iron ore has been found in the state, some of them apparently promising.

Chromium. Brief but thorough description of the largest single known deposit of chromium ore in the United States in Stillwater and Sweet Grass Counties, Gives geologic description, location and extent of development. Large ore reserves and good grade. Also description of smaller deposit in Carbon County and mention of occurrence in Madison County. Discussion of uses, domestic production and imports of chromite and concentration of ores.

Molybdenum. Description and disucssion of the many occurrences of Molybdenum in Montana. Several of the deposits show good promise, but production has been small. Discussion of the concentration of Molybdenum

and uses of molybdenum and tables of production and imports of molybdenum ores and concentrates.

Tungsten. Full description of mines in Park County, Silver Bow County and Lincoln County and brief mention of other occurrences. Discussion of Chinese production, uses, marketing and concentration. Tables of Montana and domestic production and imports.

Vanadium. Discussion of the occurrence of Vanadium in phosphate rocks and elsewhere in the State.

Titanium. Discussion of the Titanium industry with tables of domestic production and imports. Description of large deposits of Titaniferous Magnetite in Glacier County which give promise of economic value.

Nickel and Tin. Listing known occurrences of these metals in Montana.

Iron Ores for Fluxing. A short description of many mines in western Montana which have produced an ore high in iron which has been valuable chiefly because it was of use as a flux in lead and copper smelters. These ores, usually containing small values in gold and silver have been mined in large amounts and have contributed largely to the precious metal output of Montana. They are still being mined to a considerable extent. Many localities noted in which this can be profitably done.

The following areas have also been covered in the same manner:

Jefferson County. A short geologic description of the nine most important districts in the county with production of each.

Madison County. Summary of mining districts. A brief account of the location, history, geology and production of eight organized and eight unorganized mining districts in Madison County.

Madison County. Rabbit (Rochester) Mining District. An account of the history and geology of the district with short history of each of the principal producers and list of mines which have been operated.

Madison County. Mineral Hill Mining District. History and geology of the district with detailed account of each of the producing mines giving history and geology of each.

Madison County. Alder Gulch District. Short history of Alder Gulch placer mining and recent placer activities. Account of quartz mines in the district.

Much progress has been made on other metals and minerals especially gold, silver, copper, lead, zinc and manganese. This inventory will finally include all the known mineral resources.

It is intended to supplement these reports by information secured from corporate and private sources and when and if funds are available to add information secured by field parties.

For practical and immediate help to small mining operators, the committee is collecting information, including costs, relative to improved roads to the various mining districts where such operators are now working. Most of these districts are in mountainous country and inside the National Forests. The expense to the counties of building these roads would be prohibitive, but it is a type of work ideally adapted to work relief. An improved road not only increases the production and employment in the district but also makes possible all year operation of the mines through providing means of transportation.

To give a clearer picture of the distribution of mineral resources in the state, a diagramatic mineral resource map is attached, Exhibit C., showing the principal areas in which the various mineral

products are known to occur in the state. The different classes of metals and fuels are distinguished by symbols that in many cases overlap especially in the case of gold and silver which are found in practically all of the base metal ores of the state.

The precious metal areas are mainly in the southwestern part of the state with outlying tracts in the northwestern and central counties.

Overlapping these areas in part is the base metal group, copper, lead and zinc which in practically all cases carry precious metal values, generally large.

The coal and lignite areas are in the eastern counties with isolated areas to the west. These are generally of recent origin and at the eastern border are lignite with gradual and regular increases in quality as the mountains are approached. They grade up to a high quality of bituminous coal near the Rocky Mountains.

The oil and gas areas, as developed are in a belt crossing central Montana from north to south with an outlying gas district in Wibaux and Fallon Counties.

The largest known deposit of chromite is shown in Carbon, Stillwater and Sweet Grass Counties. It is undeveloped, but has the promise of being a valuable asset to the nation.

Phosphate rock exists in commercial quantities and is being mined in Granite and Powell Counties.

Gem sapphires are mined in Judith Basin County and commercial sapphires are mined in Granite County and are known to occur in quantity along the Missouri River in Lewis and Clark County.

Water Resources.

The State Water Conservation and Planning Board ever since its formation has been collecting information and making surveys of the possible storage and irrigation projects in Montana. They have made a comprehensive and in some cases, detailed study of the possibilities and have made application to the PWA for thirteen projects of major importance in the rehabilitation of the farmers of the state.

After overcoming the difficulty of setting up these projects for repayment on the basis of the security of the water system itself, the first of these, the Red Lodge-Rock Creek Project was approved and contracts are being let for its construction. This project will cost $826,000 and will furnish a dependable water supply to the major part of Carbon County. This will enable farmers in that locality to raise high priced crops, seeds, sugar beets and give an opportunity for part time workers in the coal mines to live on subsistence homesteads. The completion of this project will stabilize the farming community and furnish slack time employment for the mining population.

Of the remaining twelve projects for which applications have been made, five are for the sole purpose of affording supplemental irrigation water to land which is now irrigated but with insufficient supply. These are the Upper Boulder in Jefferson County for the Boulder Valley, North Fork Smith River for the Smith River Valley in Meagher County, Flint Creek Valley in Granite County for the Flint Creek Valley, Bear Creek in Ravalli County for a portion of the Bitter Root Valley, and Mill Creek in Park County for a portion of the Yellowstone Valley. Four are to supply supplemental water to irrigated land with insufficient supply with an excess of storage to be used on land not now irrigated or for

power generation. These are the Ruby River in Madison County, Willow Creek in Madison and Gallatin Counties, Upper Musselshell in Meagher and Wheatland Counties and Lower Musselshell in Golden Valley and Musselshell Counties. The other three are almost entirely for the purpose of supplying water to land not now irrigated. They are Broadwater-Missouri in Broadwater County, Bainville in Roosevelt County and South Willow Creek in Musselshell County. The Bainville and South Willow Creek projects are flood irrigation projects with supplemental storage.

The amounts applied for on all of the thirteen projects are:

Five Projects, Supplemental Supply	$941,000
Four Projects, Supplemental Supply and additional water	1,514,000
Three Projects, Supply for flood irrigation & new land	1,004,000
Red Lodge-Rock Creek, Approved	826,000
	4,285,000

Additional projects on which studies have been made are -

Three with sufficient engineering data to determine their feasibility, but not enough for final application. Work on these will be completed at an early date.

Little Missouri - Carter County	110,000
Armstrong Ditch - Park County	81,000
Swamp Creek - Sanders County	20,000

A small project in McCone County which is feasible but too small to stand the legal and other general expense necessary to setting up an application to the PWA.

Upper Ash Creek	3,000

One project where investigation of the foundation for the proposed dam is yet to be determined. Preliminary application filed.

Nevada Creek - Powell County	140,000

Two projects determined to be feasible, but where the local land

owners have not yet indicated a willingness to set up repayment.

Lebo Lake - Wheatland County	$180,000
Sweetgrass Creek - Sweet Grass County	800,000

Preliminary work has been done on the Shields River where water is badly needed and additional work to determine its feasibility will be done in the near future.

The following projects have been determined to be feasible and work could be started within 60 days, but repayment must await demand for additional hydro-electric power. They would furnish employment for the unemployed labor in the Butte-Anaconda area:

Beaverhead Rock - Beaverhead County	500,000
Big Hole Dam - Beaverhead County	3,540,000

The following irrigation districts have been taken over by the Water Conservation Board for reconstruction:

Pipestone - Jefferson County
Winnett - Petroleum County

The following have been found to need reconstruction:

Brady Company - Pondera County
Edgar Canal Company - Carbon County
Columbus District - Stillwater County

Refinance is needed for the following with additional construction:

Big Horn-Tullock - Treasure County
Whitetail District - Jefferson County

There is an important list of projects which have been investigated which have a large indirect value to the community, but which cannot be set up for full repayment by the land owners directly benefitted.

Richland - Daniels County
Tyler - Fergus County
Beaver Creek - Wibaux County
Beaver Creek - Hill County
Big Sandy Creek - Chouteau and Hill Counties

Stanford - Judith Basin County
Brockway - McCone County
Tongue River - Rosebud and Custer Counties
Tally Lake - Flathead County

Another long list of apparently feasible projects is available which have good showing of repayment but on which but little information is at hand. These are being investigated as the opportunity comes and the local people show an interest. Among these now in process of investigation are several in the Bitter Root Valley. Shortage of water in the late summer occurs in some sections of this valley and there are many side streams with storage possibilities. Investigation is being done on:

Tin Cup Lake
High Lake
Canyon Creek Lakes
Kootenai Creek Lakes
Missoula-Carlton
Ravalli Land and Irrigation Company
Sunset Irrigation Company, all in Ravalli County with others in the same valley.

On certain other projects, engineering work was done but they were found not to be feasible at the present time. These include:

East Madison-Madison County
Rock Creek-Valley County
Sioux Charlie Lake-Stillwater County
Race Track Creek-Powell County

The State Water Conservation Board also is conducting an investigation on the possibility of building small self-liquidating storage and irrigation projects in the eastern part of the state. They propose to build these from the state revolving fund and are especially interested in storage projects in the grazing districts which would be especially useful in providing winter feed for livestock.

The Water Conservation Board has collected an enormous amount of data and information regarding the water resources of the state, an account of which would be entirely too long for this report. An addit-

ional report on our progress in water conservation and investigation is now in process and will be forwarded when completed.

Another important factor in these project surveys is their relation to power development. The large storage projects result in all cases in securing a more uniform flow in the stream which is used. Where the stream is used for the generation of power it increases the amount of firm power by cutting down the peak flow and increasing the low water flow of the stream. This is of particular value on the head waters of the Missouri River where a total of about 600 feet of head is used in the various plants now installed from Canyon Ferry to Great Falls. This applies to such projects as the Big Hole Dam, Beaverhead Rock Dam, Ruby River and Willow Creek and it also applies to all the major storage projects proposed along the Yellowstone River.

The accompanying irrigation map, Exhibit B, shows the projects which have been recommended by the Bureau of Reclamation as its 1935 program. They include:

1. Buffalo Rapids - Custer, Prairie and Dawson Counties.
2. Musselshell - Wheatland, Golden Valley and Musselshell Counties.
3. Sun River Completion - Cascade County
4. Chain of Lakes - Hill County
5. Como Lake - Ravalli County
6. West Gallatin Survey - Gallatin County
7. Marias Survey - Toole, Liberty, Hill and Chouteau Counties.

The State Water Conservation Board's projects which are ready for immediate construction are numbered as follows:

8. Red Lodge-Rock Creek - Carbon County
9. Upper Boulder - Jefferson County
10. North Fork Smith River - Meagher County
11. Ruby River - Madison County
12. Willow Creek - Gallatin and Madison Counties.
13. Flint Creek - Granite County
14. Broadwater-Missouri - Broadwater County

15. Bainville - Roosevelt County
16. South Willow Creek - Musselshell County
17. Bear Creek - Ravalli County
18. Mill Creek - Park County
19. Upper Musselshell - Meagher & Wheatland Counties
20. Lower Musselshell - Golden Valley & Musselshell Counties
21. Nevada Creek - Powell County
22. Winnett District - Petroleum County

The Upper and Lower Musselshell projects cover the same territory as the Musselshell project of the Bureau of Reclamation and are an alternative in the event that the Bureau Project is not authorized. There are several other projects on which work will be done this year, through the PWA on large projects and with the state fund on smaller ones. These are not yet fully lined up for construction.

Rural Electrification.

The following report on the rural electrification survey has been submitted to the Power Resources Committee by G. M. MacMillan, Engineer for the FERA.

"At your request I am submitting a narrative report which briefly sums up the work attempted under the Rural Electrification Survey.

"On November 24, 1934 Working Procedure Stencil 4186, entitled "Preliminary Rural Electrification Survey, F2,13," was sent out from Washington. On January 10, 1935 a supplement to Working Procedure F2, 13 was issued which contained detailed information regarding the type of information to be obtained in the preliminary reconnaissance. Attached to this bulletin were two forms to be made out in the field covering specific information such as the number of potential customers, the expectancy of kilowat hours per month, the expectancy of appliances to be used, and the expectancy for motors. Another chart supplies information as to the number of acres cultivated, whether owned or leased by a tenant, number of rooms per house, number of people on the farm, the

number of buildings, such as barns, poultry houses, dairies, etc., and other pertinent information.

"At the inception of this program the Montana State Planning Board under the direction of Mr. L. A. Campbell, called a meeting of the Power Resources Committee consisting of the following gentlemen:

W. S. Thompson, Secretary, Chamber of Commerce, Butte.
A. C. Pratt, Montana Power Company, Butte.
A. T. Schultz, Montana Power Company, Great Falls.
Sam Robins, Engineer, Simms, Montana.
Henry Gerharz, Engineer, Flathead Irrigation District, St. Ignatius.
Major Thomas Larkin, Corps of Army Engineers, Glasgow.
Prof. M. R. Good, Technical Advisor of Power Resources Committee, State College, Bozeman.
Prof. C. F. Bowman, Technical Advisor of Power Resources Committee, State College, Bozeman.

"At this meeting the provisions of the bulletin were discussed and tentative plans set for the conduct of this survey. In the interim Mr. J. C. Lindsey, Regional Engineer from Washington, D. C. came to Montana with specific instructions to set up the personnel and institute the working procedure. This Mr. Lindsey did, and in early February nineteen reconnaissance engineers were sent out under the supervision of Mr. Joe E. Bell of the Montana Power Company, whose services were loaned to the Montana Relief Commission for this purpose. Splendid cooperation has been achieved from all available sources, including data and maps compiled by the existing utility companies, references from the Department of Agriculture, the State Forestry Department, and the Montana State College. Hampered by poor road conditions and a stringency of funds, the survey has nevertheless proceeded with satisfactory results, and at the present time it is estimated that 60% of the entire state has been reconnaissanced and detailed information obtained.

"The state, under the Montana Relief Commission, was divided into six districts and in each of these districts a district engineer, respon-

sible to the Work Division of the Montana Relief Commission, exercised authority. Working through these district engineers our reconnaissance surveys were placed in what was determined by experience and judgment to be the six most likely areas in the state. The first project attempted was in District 1, the Bitter Root Valley in the vicinity of Hamilton, an irrigated valley in which limited power is being supplied by the Montana Power Company, but a good potential possibility for an increased use of electricity. In District #2, an area in the Gallatin Valley, in the vicinity of Bozeman and Belgrade was reconnaissanced. In District #3, the Sun River Valley in the vicinity of Fort Shaw; in District #4, the Huntley Irrigation Project; in District #5, the Milk River Valley from Malta to Chinook; in District #6, the Lower Yellowstone Valley in the vicinity of Sidney.

"These major projects have been completed and our operations have been extended throughout the various other districts of the state as indicated on the attached Map, Exhibit D. The horizontal lined areas on this map show completed projects, the areas with vertical lines are those in which investigations have been made and in which detailed reconnaissance will be executed; the background of white indicates that the population is so thinly scattered that electrification at this time is not tenable.

"The limited information out of Washington has made it difficult for us to determine the limits to which we might extend our investigation. A letter from Mr. George H. Andrews, Staff Engineer, Washington, D. C. speaks of a minimum of 3600 kilowats per mile per year, and a potential customer load of 3.6 persons per mile. If we adhere strictly to this there will be very little electrification in Montana. In order to be sure however, that we have contacted every possibility, we have lowered

our gates to a potential customer load of 2 persons per mile, and a kilowat hour per mile per year of 2500. Thus the information we are gathering will be available for future use if the customer load can be built up through the Rural Rehabilitation Division's efforts, or through the trend of population to irrigable and fertile areas of the state.

"We have given particular attention to every application or suggestion which has been sent into us or any other government agency by citizens or farmers who are sufficiently interested in this program to report needs of electrification in whatever degree. As a result we have investigated a number of applications which were known to be not feasible when the applications were received, but in order to satisfy the citizens we have given them the same attention in the matter of reconnaissance as those which were thought might present opportunities for feasible construction projects.

"By following the irrigable and fertile areas of the state, we are providing information that can be of great use to the Rural Rehabilitation program, and undoubtedly some of those projects which are not now feasible can later be considered admirable from the standpoint of consumer load when these areas have been more thickly settled.

"In order to show the type of information that is being sent to Washington, we are attaching a detailed map of one of the areas which we have investigated. Exhibit E. (Not included in this report). It is impossible at this time to submit the completed questionnaire because this data has not been assimilated for report. We are attempting to clear through Washington one feasible project in the state and tentatively have agreed that the Sun River Project is the most acceptable. This project will be presented to Washington in full as a test project

to determine the possibility of construction under the new Works Program."

(Signed) G. M. MacMillan, Engineer
Montana Emergency Relief Administration

Transportation

An investigation of the Railroad, Highway and Airway Facilities in Montana shows that the transportation problem is mainly one caused by the distance of the state from the larger markets. There are some needed extensions of the Airway System but the through routes by rail and highway are sufficiently developed for present use. There are additions needed in farm to market roads and roads to mining districts to bring products to main highways and shipping points. Exhibit F, shows the railroads, main highways, airways and gas lines now completed and in operation.

Respectfully submitted,

L. A. Campbell
Montana State Planning Consultant

LAC:L-B

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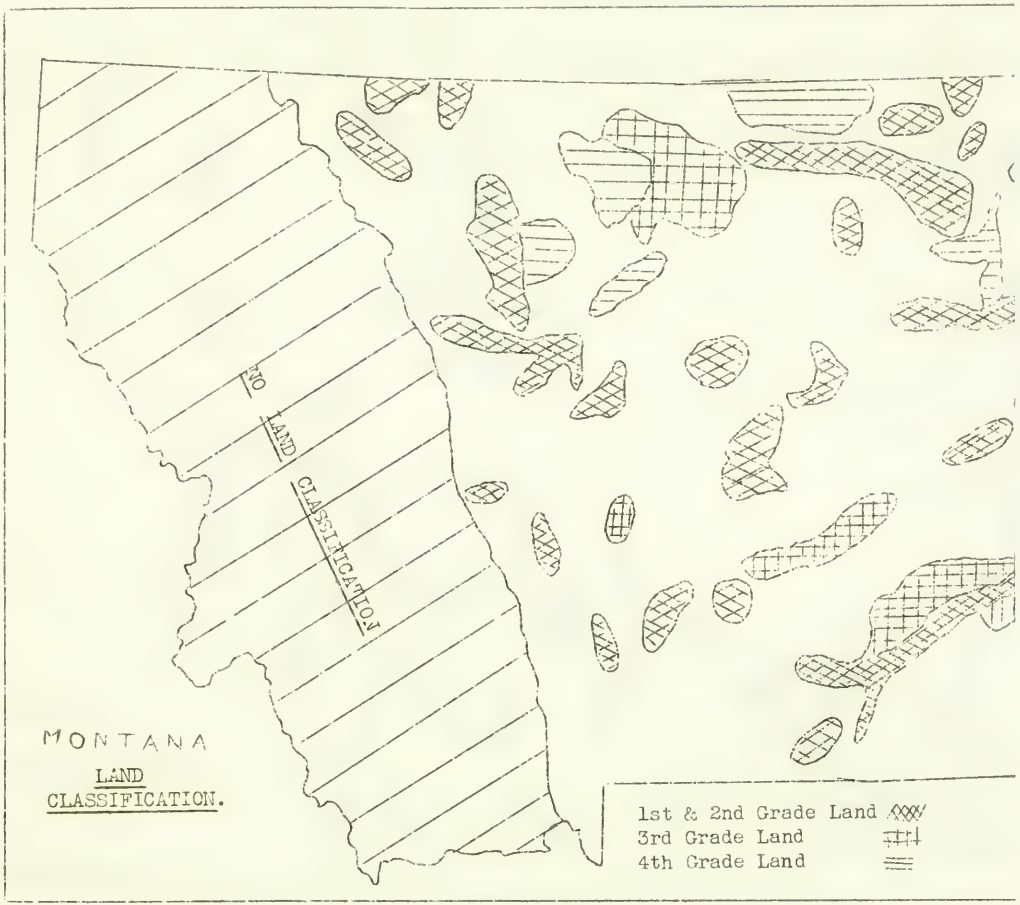
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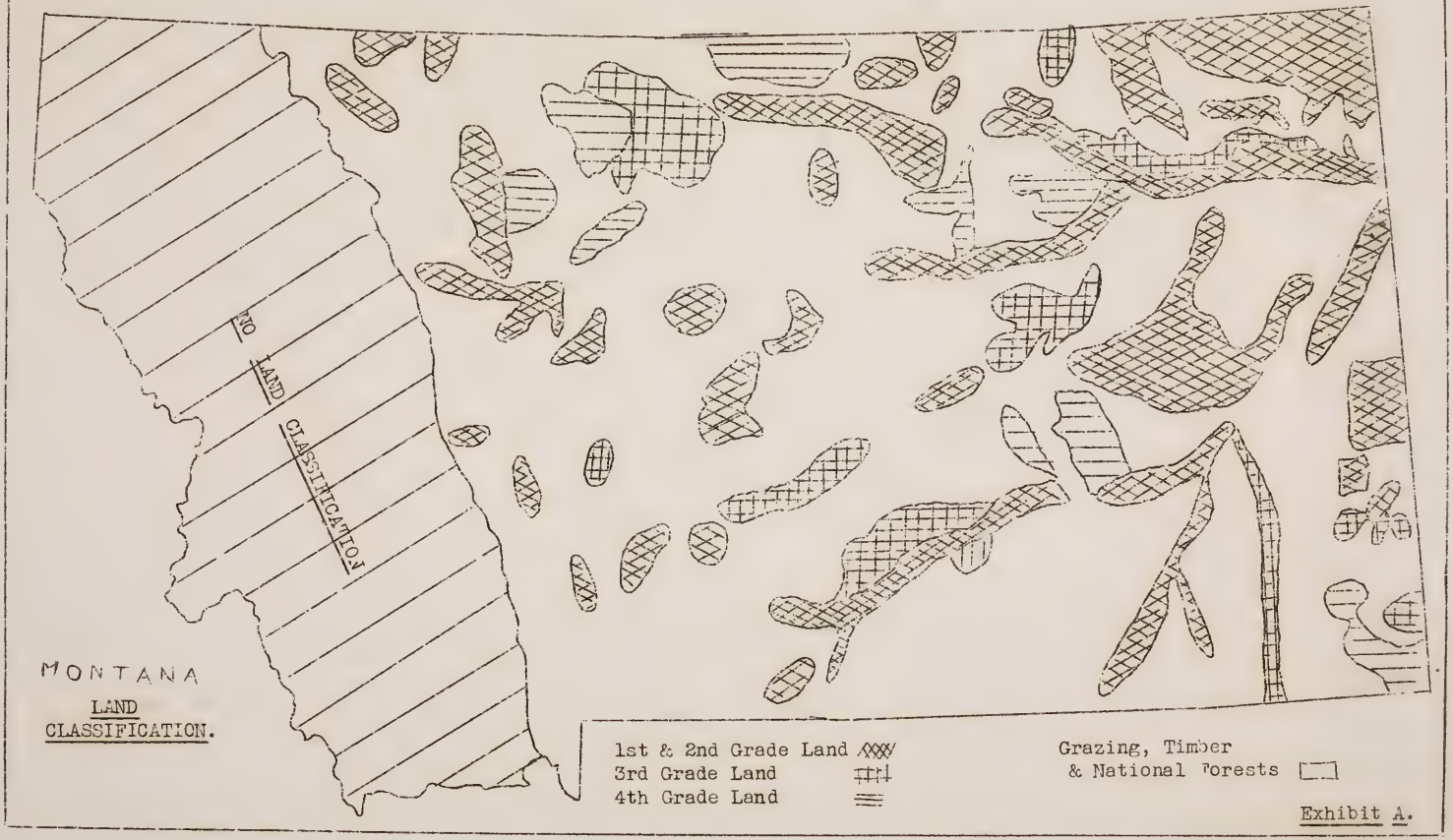
MONTANA
LAND
CLASSIFICATION.
1st & 2nd Grade Land
3rd Grade Land
4th Grade Land



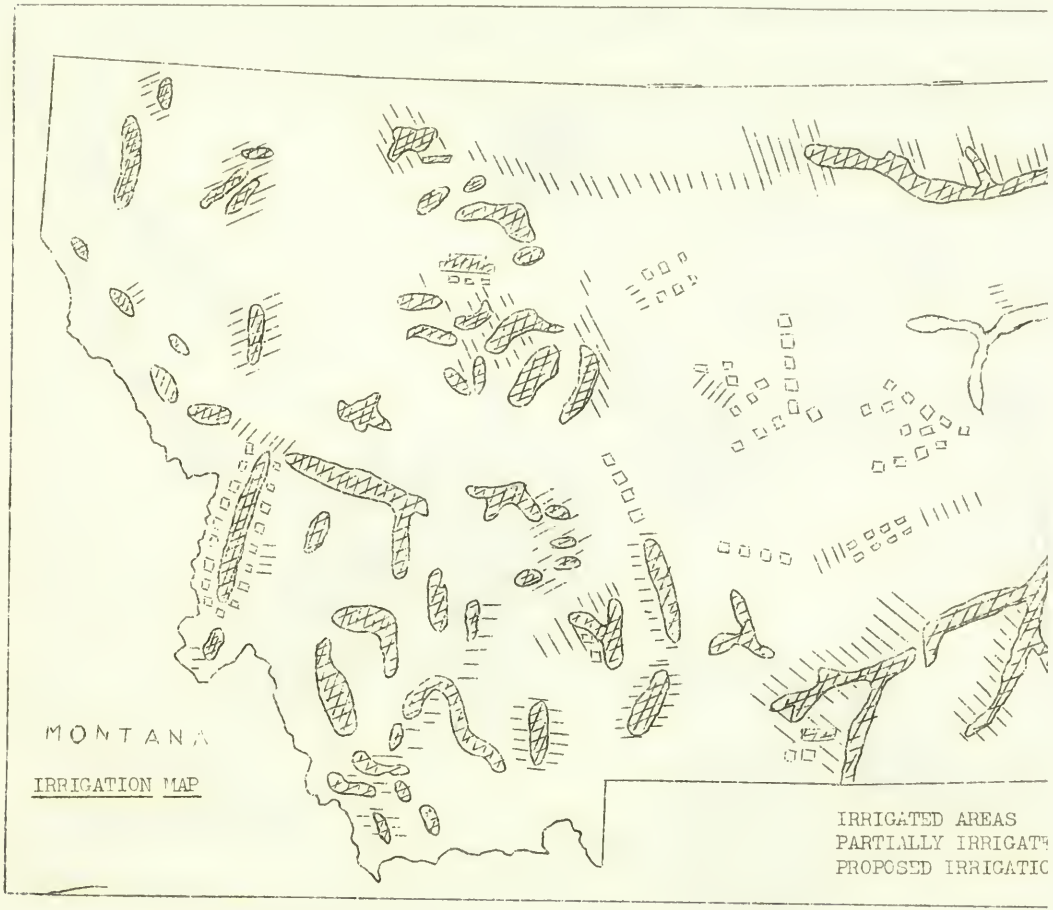
MONTANA

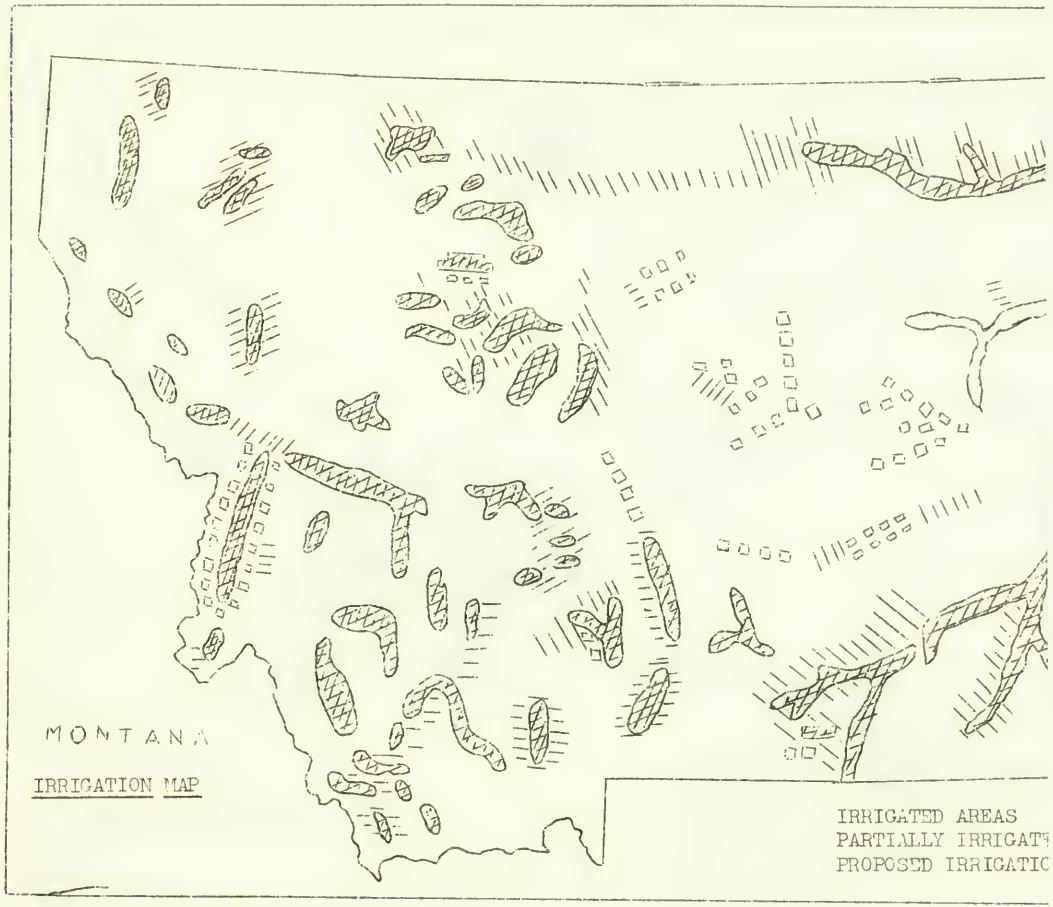
LAND
CLASSIFICATION.

1st & 2nd Grade Land
3rd Grade Land
4th Grade Land

Grazing, Timber
& National Forests

Exhibit A.


MONTANA
IRRIGATION MAP
IRRIGATED AREAS
PARTIALLY IRRIGAT
PROPOSED IRRIGATIC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IRRIGATION MAP
IRRIGATED AREAS
PARTIALLY IRRIGAT
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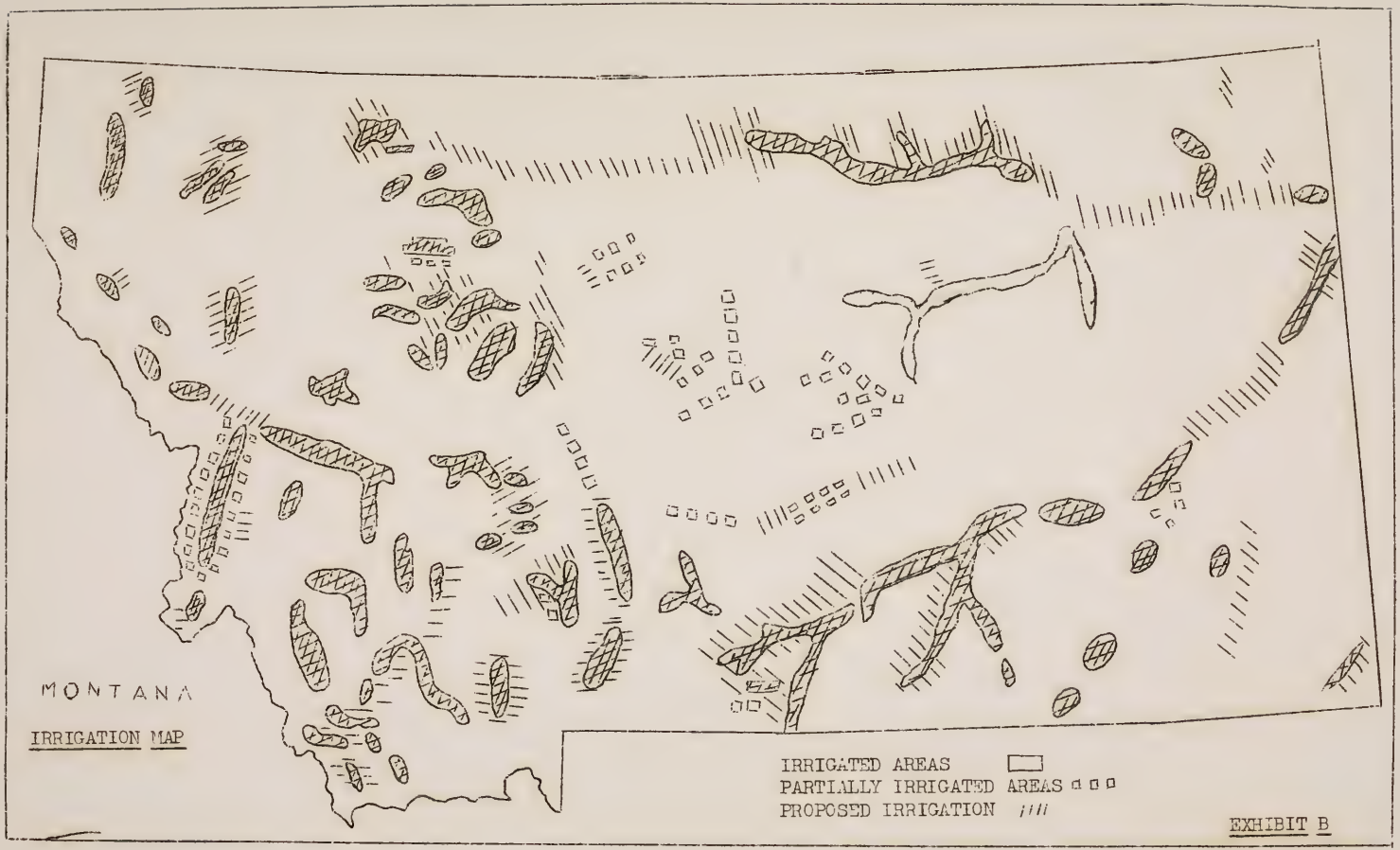
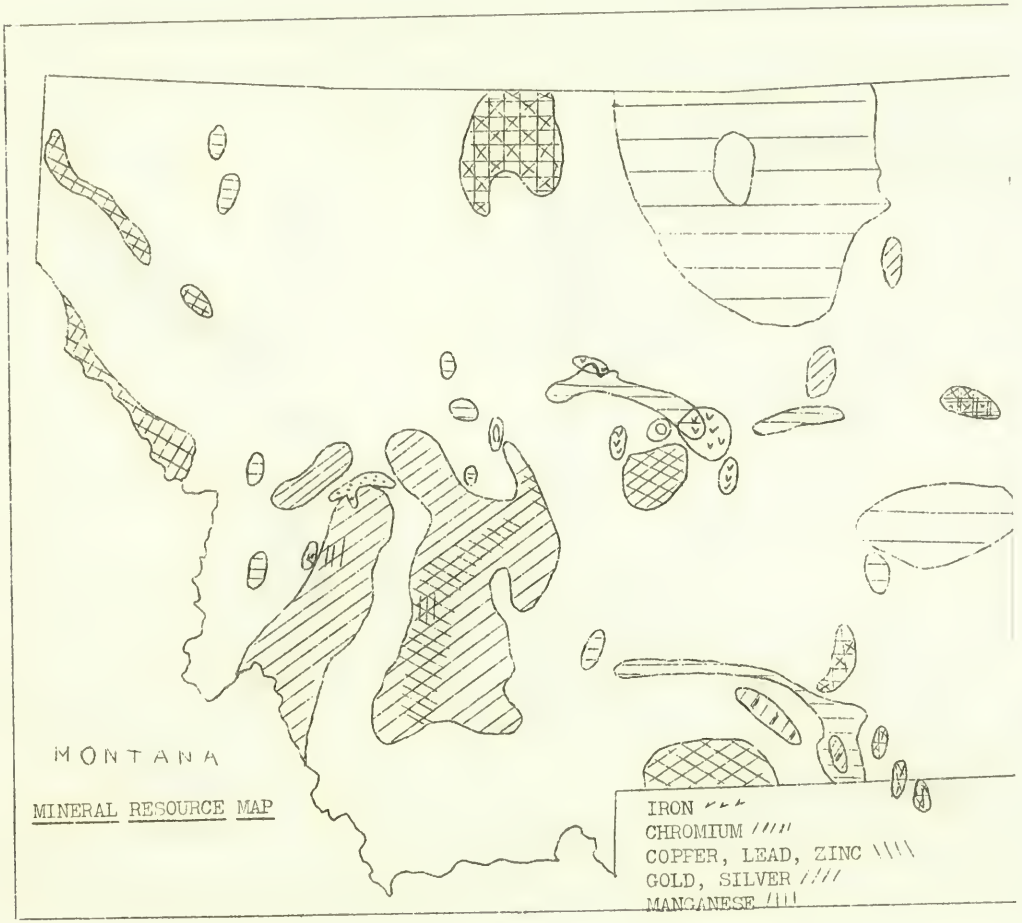
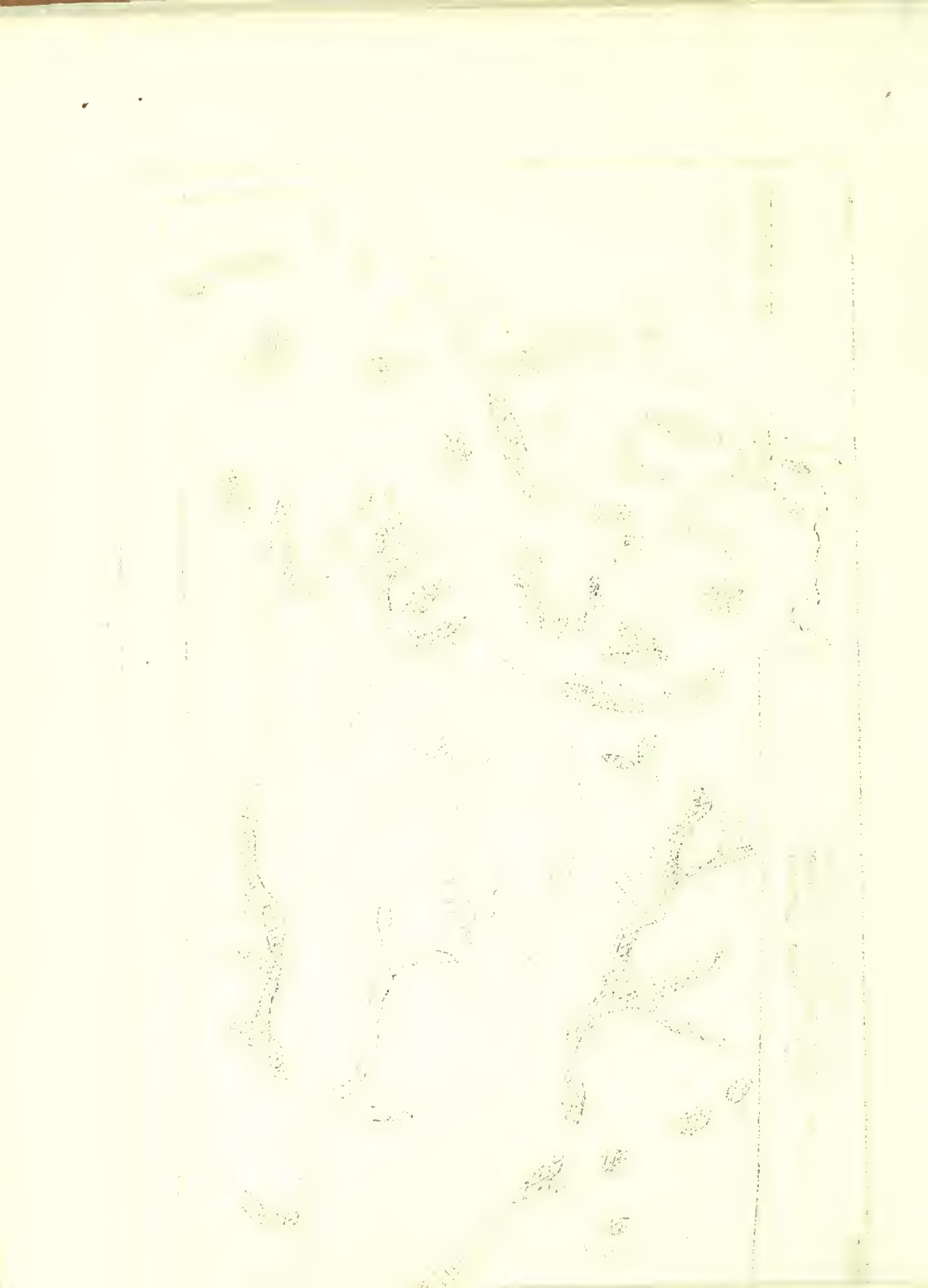
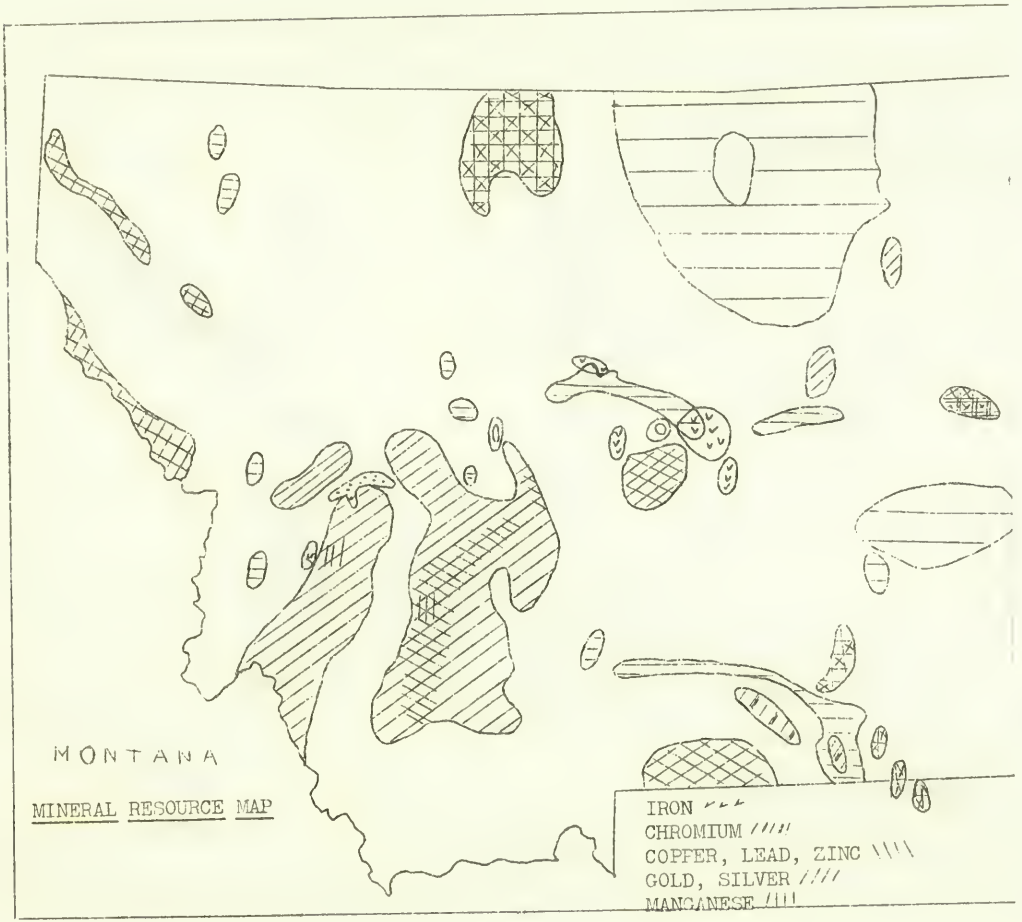

MONTANA
IRRIGATION MAP
IRRIGATED AREAS
PARTIALLY IRRIGATED AREAS
PROPOSED IRRIGATION
EXHIBIT B


MONTANA
MINERAL RESOURCE MAP
IRON
CHROMIUM
COPPER, LEAD, ZINC
GOLD, SILVER
MANGANESE

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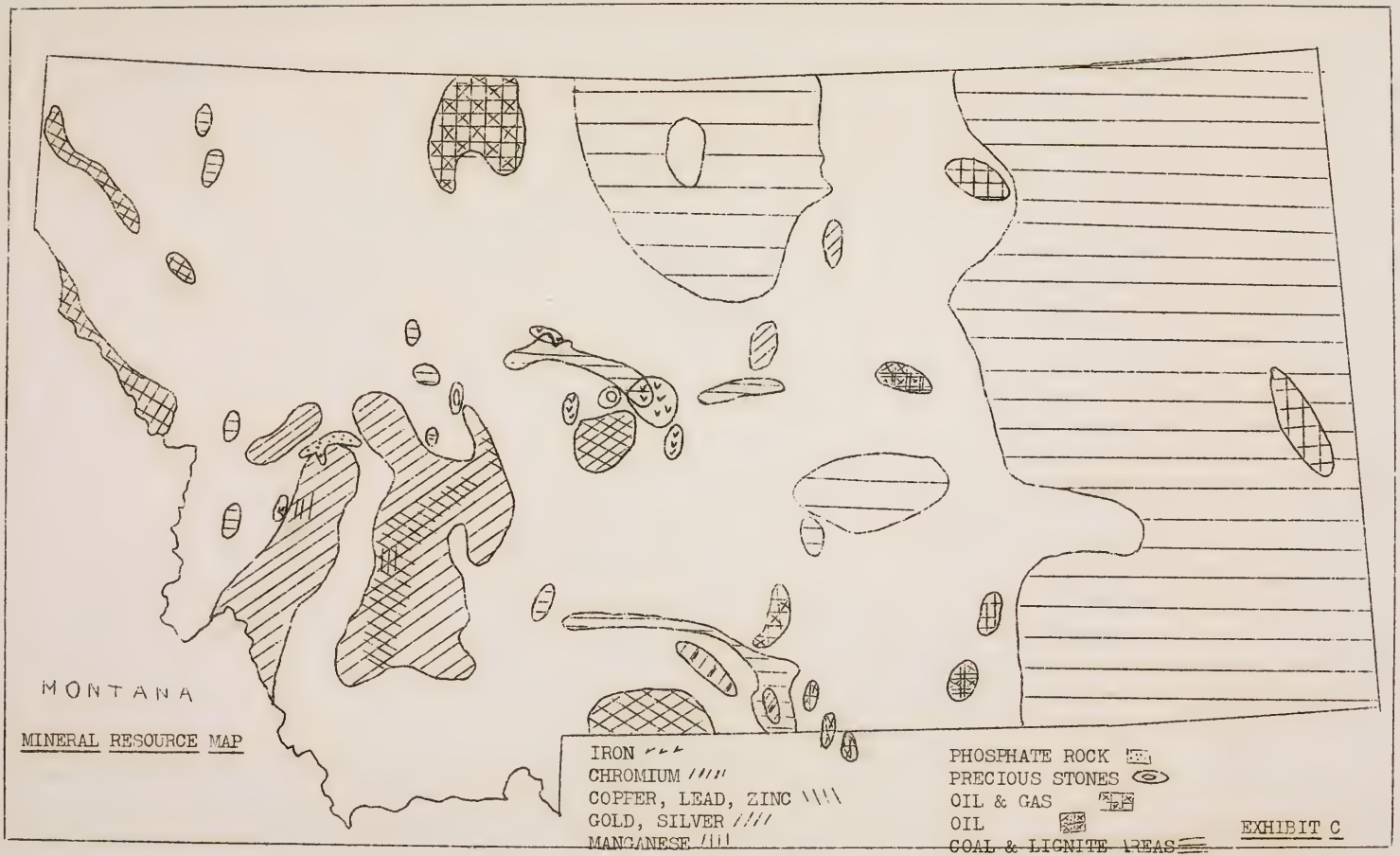
MINERAL RESOURCE MAP
IRON
CHROMIUM
COPPER, LEAD, ZINC
GOLD, SILVER
MANGANESE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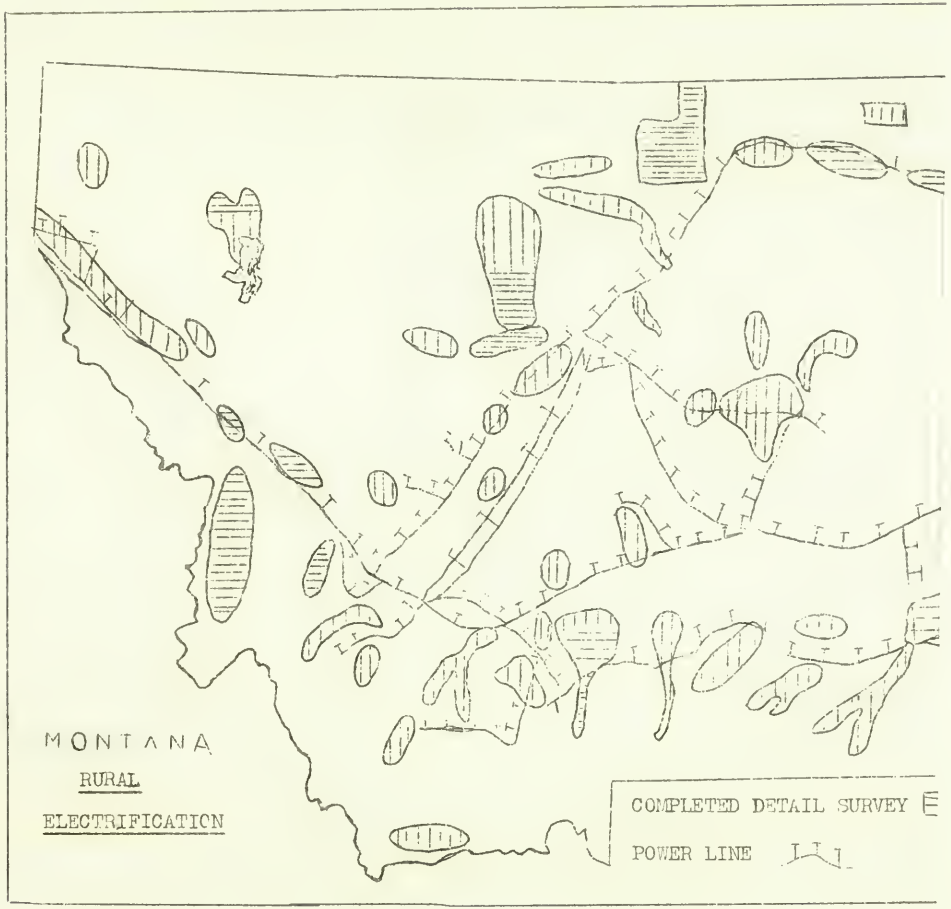
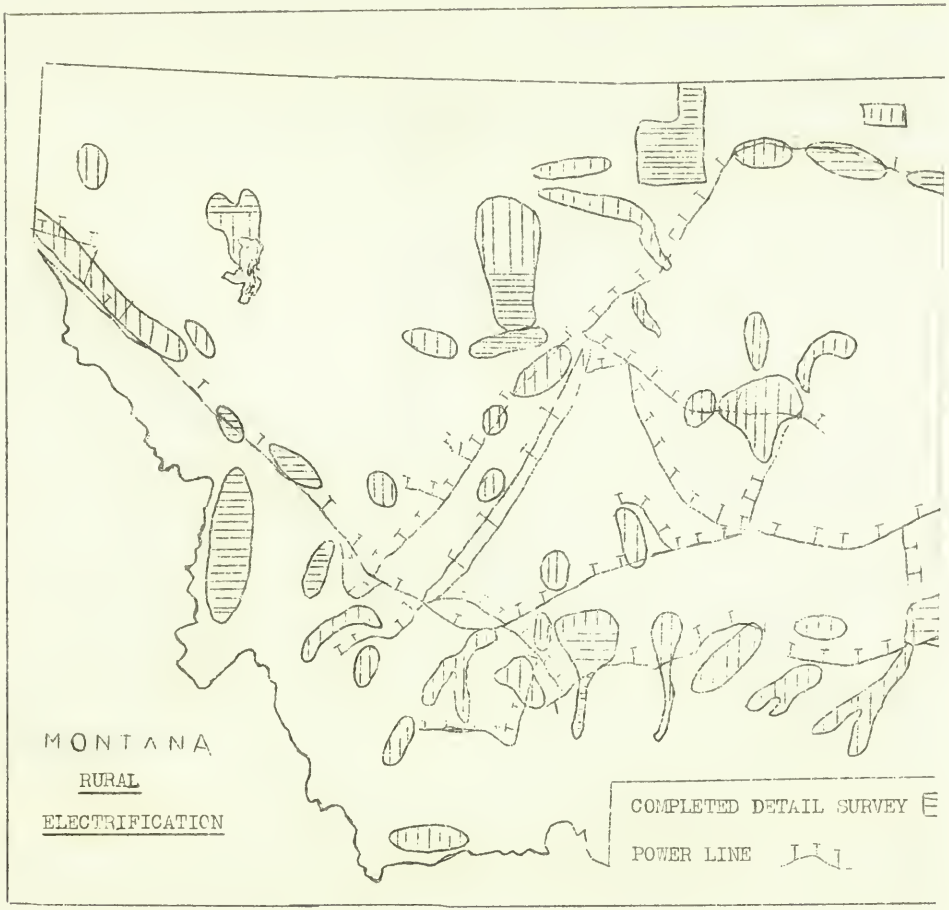
MINERAL RESOURCE MAP
IRON
CHROMIUM
COPPER, LEAD, ZINC
GOLD, SILVER
MANGANESE
PHOSPHATE ROCK
PRECIOUS STONES
OIL & GAS
OIL
COAL & LIGNITE AREAS
EXHIBIT C


MONTANA
RURAL
ELECTRIFICATION
COMPLETED DETAIL SURVEY
POWER LINE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RURAL
ELECTRIFICATION
COMPLETED DETAIL SURVEY
POWER LINE

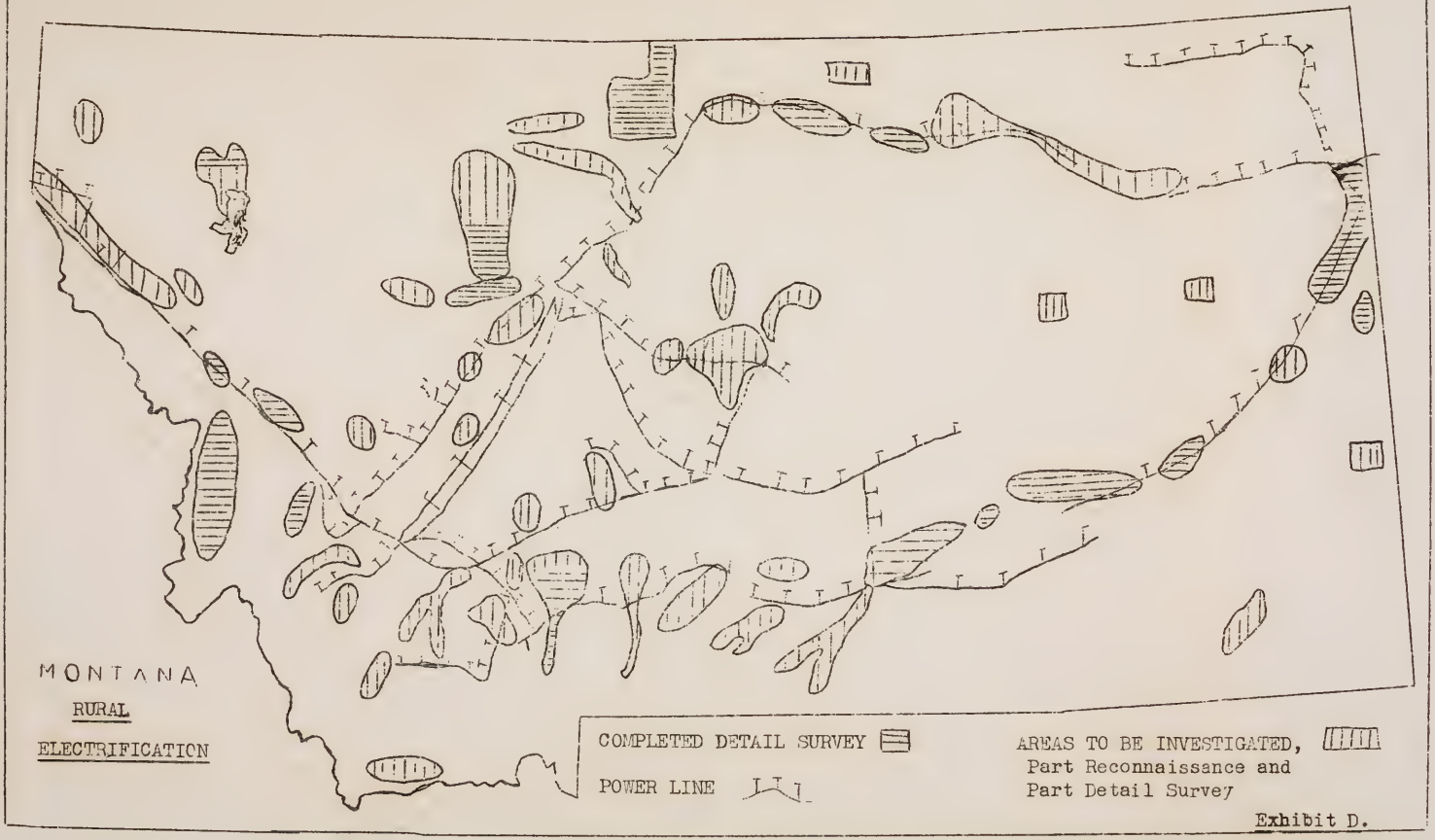
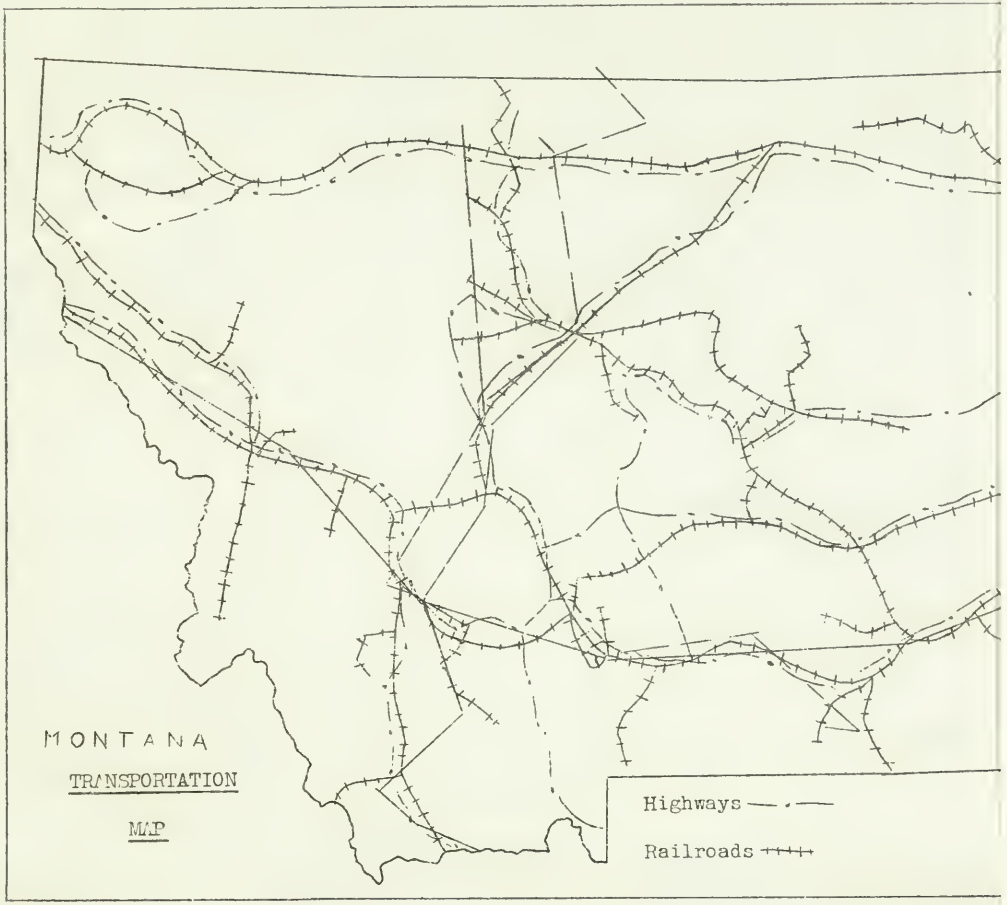
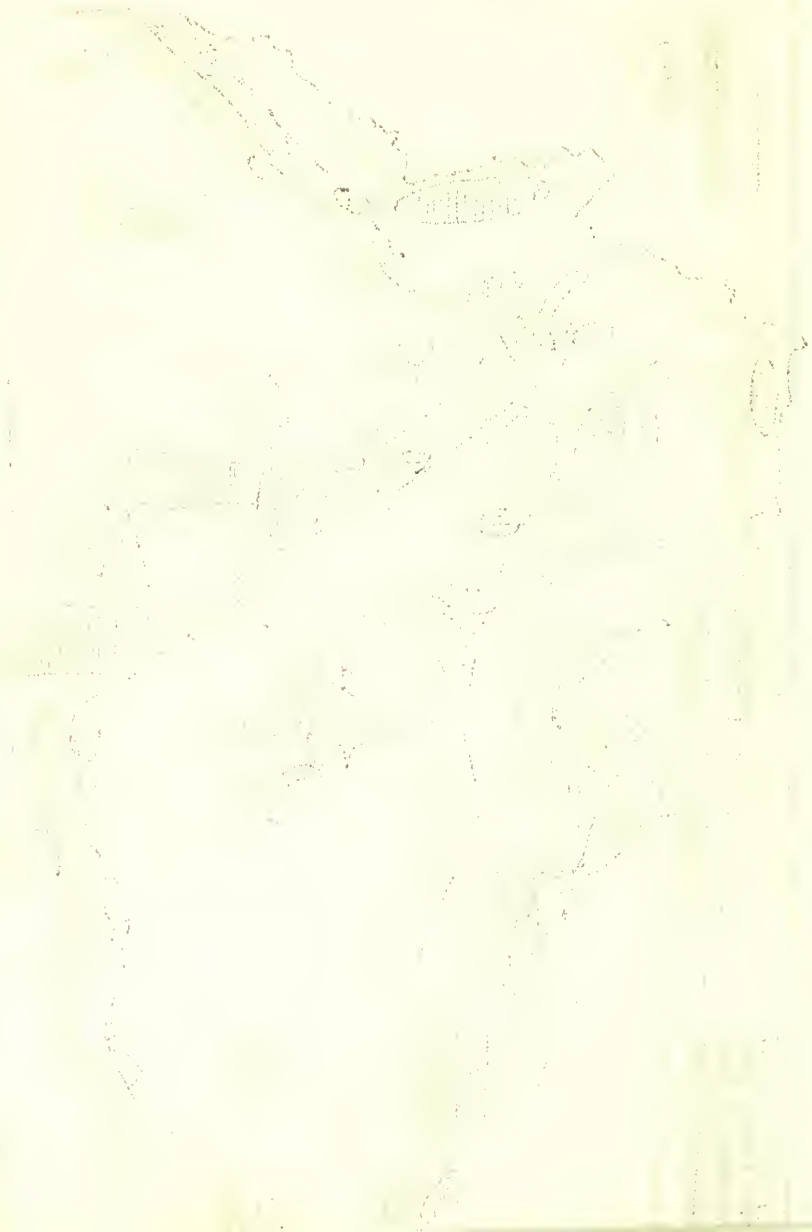
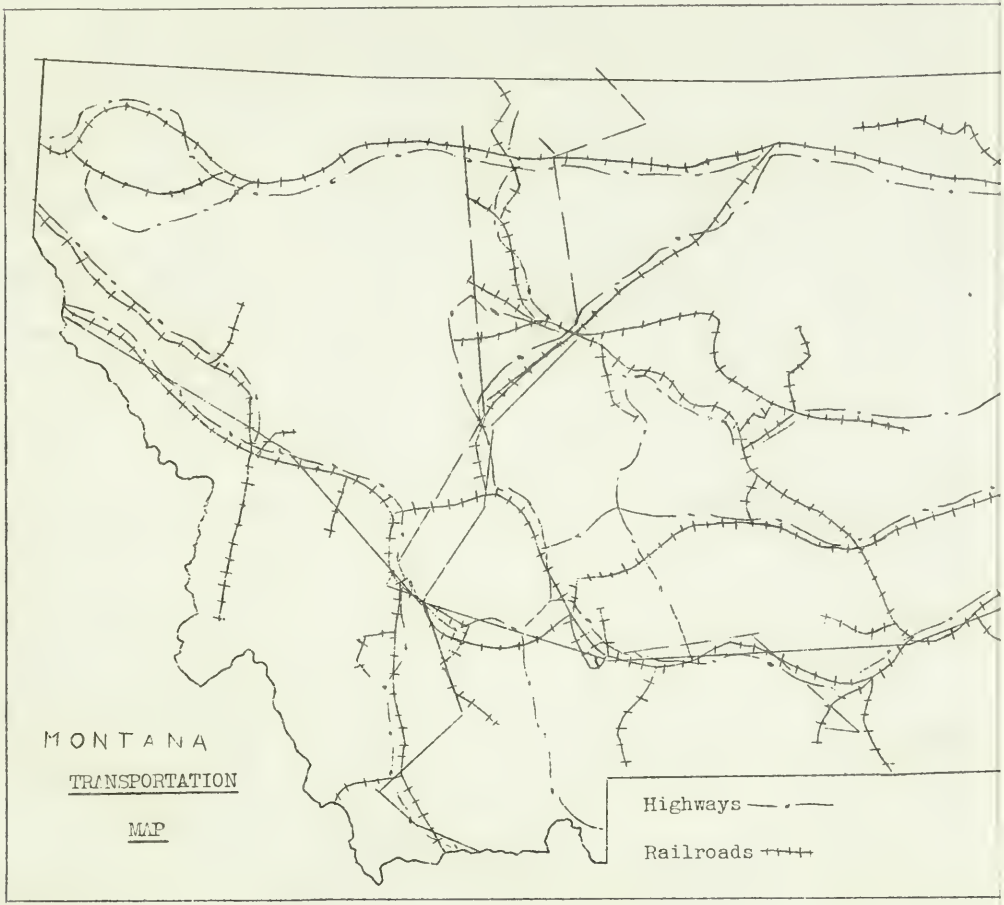
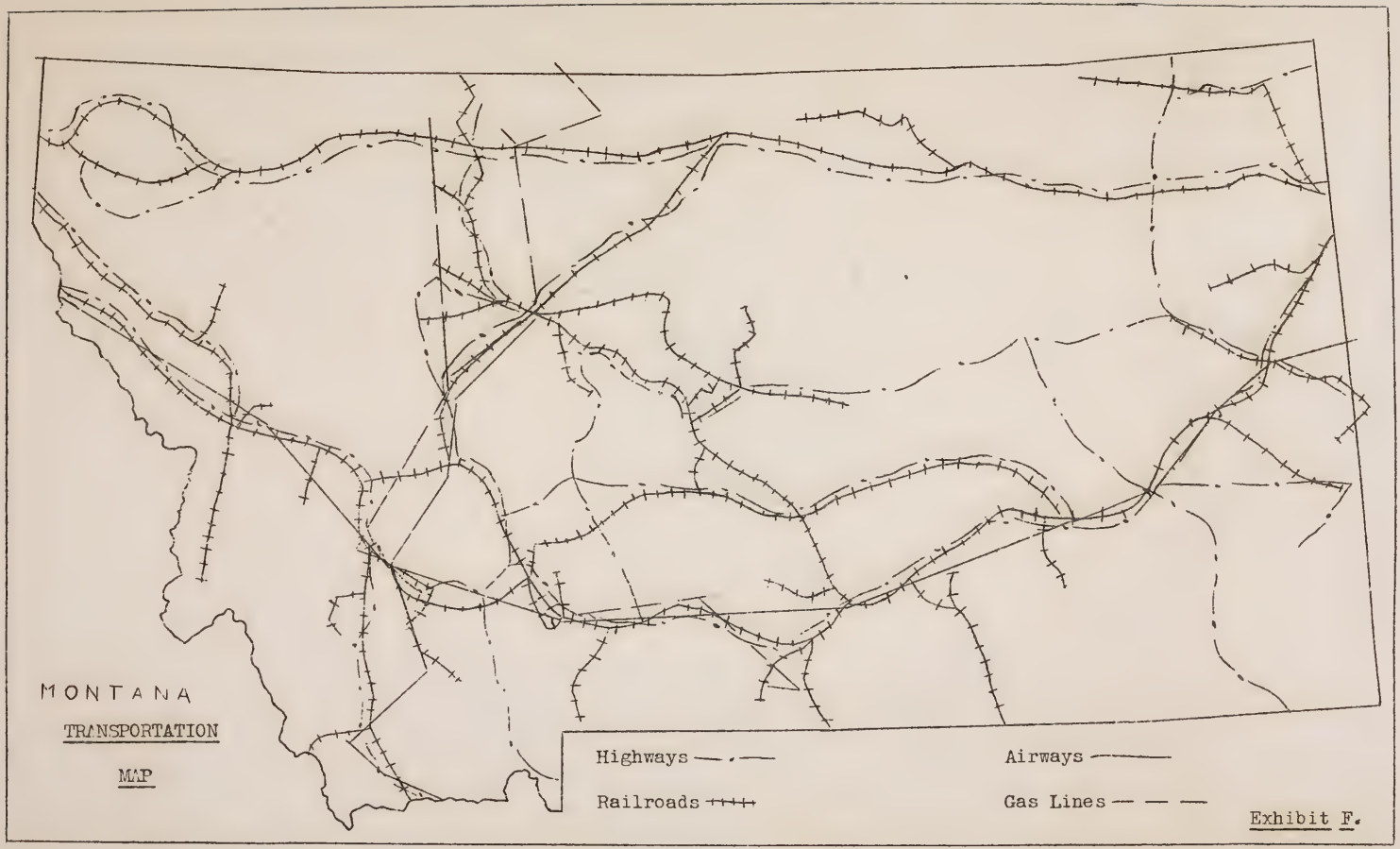

MONTANA
RURAL
ELECTRIFICATION
COMPLETED DETAIL SURVEY
POWER LINE
AREAS TO BE INVESTIGATED,
Part Reconnaissance and
Part Detail Survey

Exhibit D.


MONTANA
TRANSPORTATION
MAP
Highways
Railroads




MONTANA
TRANSPORTATION
MAP
Highways
Railroads


MONTANA
TRANSPORTATION
MAP
Highways
Railroads
Airways
Gas Lines
Exhibit F.

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